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UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF WYOMING

CORONAVIRUS REPORTER CORPORATION,  
CALID INC.,

*on behalf of themselves and  
all others similarly situated*

Plaintiffs,  
*vs.*

APPLE INC.  
Defendant.

Case No. 24-cv-53-SWS

**SHERMAN ACT ANTITRUST  
CLASS ACTION**

**COMPLAINT FOR DAMAGES  
AND INJUNCTIVE RELIEF**

DEMAND FOR JURY TRIAL

## **PLAINTIFFS' COMPLAINT FOR DAMAGES AND INJUNCTIVE RELIEF**

### **I. INTRODUCTION**

1. This class action seeks to redress Defendant Apple Inc.'s anti-competitive business practices in the Sherman Act relevant market for United States smartphones, as well as related markets for smartphone apps and their distribution channels. As described herein, the Defendant corporation engages in improper conduct that censors app developers, such as Coronavirus Reporter Corporation ("Coronavirus Reporter").
2. Apple's censorship mechanism functions primarily by tying app distribution to its iPhone smartphone, using a digital "notary stamp" to mark each piece of software approved in the App Store. This illegal *per se* tying, as elucidated in *Northern Pacific Railway Co. v. United States*, 356 U.S. 1 (1958), threatens the very pillars of free commerce and discourse over the internet.
3. The significance of the litigation against Apple Inc. before this Court transcends mere economic concerns. It calls to question the very fabric of our societal order, defined and heavily influenced under the shadow of Apple's internet dominance. Apple's conduct, unchecked for over a decade, threatens this nation on a cultural, economic, and security basis. For nearly fifteen years, the internet as most Americans know it has been crafted and controlled by Apple Inc's exploitative policies. This has resulted in consequences that are admittedly difficult to assess, as for many it is difficult to now imagine a world without the iPhone. But what we do know is that Apple monetized people's

attention, encouraging addicting apps and services that now constitute about a third – and growing – portion of Apple’s profits. In other words, Apple as an ongoing concern requires increasing monetization of daily activities, rather than sale of hardware.

4. Apple’s censorship of the internet is increasingly authoritarian. With *Coronavirus Reporter*, Apple prevented a world-renowned scientist from competing with their own COVID app. A year earlier, Apple notoriously banned the Parler App during a presidential election. We are approaching twenty years of an internet controlled by Apple. The internet has transformed our lives. But a free internet – one that could grow without Apple’s corporate vice – is something we have never experienced as a nation. The time to liberate the nation’s internet is now – not six months or six years from now.
5. Apple will continue to censor the internet, stifling this country’s economy<sup>1</sup> and creating dangerous cultural voids, unless this Court intervenes with a clear message. Plaintiffs bring forward a straightforward and efficient basis to do so. Other efforts have proven insufficient. *Pepper*, Bipartisan Senate bills, United States Copyright Office, and *Epic* are only a partial list. How many more years must we as a nation be held hostage to Apple’s agenda? A forthcoming preliminary injunction must be issued without delay.

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<sup>1</sup> Protectionist views, typically concerned about tempering Apple’s historic stock performance, are myopic. Apple censors thousands of apps that collectively would create American investment opportunity and cultural gains which surpass Apple’s singular success.

6. Pivotal national metrics – such as student attention span and other metrics of physical and mental health are hitting alarming lows. Social polarization, online bullying, and other woes of the internet age indicate failed leadership under Apple. While we don't understand all of the causes of these serious repercussions, certainly Apple's driving force in monetizing basic human interaction didn't help. We cannot afford, as a nation, to allow the Apple dictatorship to lead us into the Artificial Intelligence era. Hindsight reflection of Apple's 1984 Big Brother commercial inaugurating the Mac, from which iPhone is derived, is rather ominous.

## **II. STATEMENT OF THE CASE**

7. Dr. Robert Roberts, the Chief Medical Officer for Coronavirus Reporter, is a widely recognized figure in academia whose work has impacted the lives of many. Prerequisite to nearly every cardiac procedure or hospital screening for myocardial infarction ("heart attack") is laboratory blood analysis to detect damaged cardiac muscle tissue. In the 1980s, Dr. Roberts pioneered the MBCK blood test used for two decades as a "gold standard," and which directly laid the foundation for the current troponin lab test. Dr. Roberts earned the trust of NASA as Shuttle Cardiologist. Apple, however, deprived its userbase the benefit of Dr. Roberts' scientific expertise and dedication towards saving lives, when the Respondent corporation improperly blocked his app in February 2020 to develop their own. Apple's SARS-CoV-2 tracing system never reached widespread availability or implementation in the United States. Dr. Roberts'

voluntary symptom reporting app, the first of its kind, was exactly the app needed four years ago, at the onset of the pandemic. Notably, Apple blocked the entire class of independent COVID apps, even those with institutional affiliation such as Dr. Roberts, a Director of Cardiac Translational Research at University of Arizona and former CEO of Ottawa Heart Institute.

8. Apple today wields authoritarian control over the vast network of interconnected smartphones that, combined, represent an extraordinary computational-communications capability (“network effect”). After the United States government spent decades building what is now known as the Internet, we as a nation collectively invested in putting a smartphone, an amalgamation of a screen, sensors, operating system, and communication radios, in the hands of nearly every citizen, forming a network with capabilities amounting to science-fiction of prior generations. But it is Apple that benefits from growing “services revenue” representing its own tax on nearly the entire internet economy created by the United States government.
9. This action is brought to assert that the vast network capabilities of interconnected smartphones are the property of the customers who paid for them. Apple iPhone users should enjoy unrestricted use of their smartphones to run necessary applications, such as *Coronavirus Reporter*, that ultimately are the *raison d'être* of this network. Free markets should define what apps are selected by end-users, as opposed to Apple's regime.

10. There exist serious and growing ramifications of the monopoly. Apple's anticompetitive proceeds, a *de facto* tax on the Internet and developers, are increasingly influencing geopolitical matters. Apple endorsed changing "Made in Taiwan" product labels to "Made in Chinese Taipei." Similarly, the company's CEO was last year discovered to have made a surreptitious \$270 billion payment to China, never disclosed to Apple shareholders. Political censorship of an entire domestic political party during an election, i.e. the *Parler* app, foreshadowed continued efforts to takedown Twitter, due to the company's political differences with Elon Musk. Censoring Dr. Roberts, trusted by NASA for John Glenn's final mission, was an assault on science, and certainly un-American.

11. There are reasons the Sherman Act was legislated to preempt one company taking on monopoly powers that could ultimately endanger not only the progress of scientific medical work like *Coronavirus Reporter*, but even geopolitical entities. This Complaint describes an "international consensus," which Apple cannot refute exists, that denounces Apple's anticompetitive censorship.

12. Apple's opposition to antitrust enforcement echoes discredited fear-based arguments similar to those historically used by AT&T, claiming that safety and quality will decline. When the United States sought regulation of AT&T, the monopolist warned that telecommunication quality and cost would suffer from government intervention. That of course was plain wrong, as a

telecommunications revolution occurred the following decade. The stakes here are higher than in 1984: 80% of commerce now takes place on Apple devices, and the entire free speech of a nation depends on its “network effect” infrastructure.

13. This case is an unprecedented confrontation with the largest monopoly in history, Apple Inc.—a \$3 trillion behemoth whose market valuation eclipses that of the classic textbook example, the British East India Company, by tenfold. With iPhone’s 65% market share, the vast majority of Americans find themselves with limited alternatives for conducting the essential tasks of daily life. Defendant’s illegal trust operations extend beyond economic ambitions; this case concerns Apple’s desire to censor health care and effect cultural political development on a worldwide basis. Apple’s control over their userbase forms the largest censorship and surveillance network in world history.

14. Every effort until now has failed to stop Apple. In 2010, the United States Copyright Office recognized the right of iPhone users to utilize their property free from Apple’s control:

*“the activity of an iPhone owner who modifies his or her iPhone’s firmware/operating system in order to make it interoperable with an application that Apple has not approved, but that the iPhone owner wishes to run on the iPhone, fits comfortably within the four corners of fair use.”*

15. Apple swiftly maneuvered around the Copyright Office’s decision by implementing aggressive changes to its programming code. Seventy-three percent of Americans supported now-disappeared 2023 legislation in the

United States Senate to address app censorship and self-preferencing, which Senior Senator Blumenthal described as the “most offensive practice of how [Apple] strangles new app development.” Senate Majority Leader Chuck Schumer of California never brought the bill to floor vote.

16. This Complaint incorporates a Congressional Subcommittee report and findings on Apple’s misconduct. (Exhibit A). The Subcommittee remarked on unambiguous legislative intent regarding Court enforcement of Sherman:

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*“courts have adopted the view that underenforcement of the antitrust laws is preferable to overenforcement, a position at odds with the clear legislative intent of the antitrust laws.”*

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17. The claim theory underlying this Complaint contains novel and theoretically straightforward approaches to invoke Sherman Act. First, a *per se* tying claim between the iPhone and App Store exemplifies pernicious conduct under *Northern Pacific*. The tying claim also alleges a Notary Stamp tax – which amounts to the largest Stamp Tax in history. Second, Plaintiffs describe an App Market for free apps, possibly exempt from Brown Shoe metrics that are inapplicable to today’s digital markets. Third, Plaintiffs define exclusionary behavior under *Aspen Skiing* that leverage its userbase access monopoly, and related supra-competitive fees charged to developers that access the userbase.
18. This case is brought after a lengthy *Epic* case against Apple failed to obtain a Sherman Act verdict, but in seeming contradiction, an *Epic* Sherman Act case against Google prevailed. *Epic*’s Apple complaint alleged an international

market for smartphone operating systems. That market was incorrect and “litigation driven” because, as Tim Cook testified, Apple sells smartphones, not devices. Pursuant to *Brown Shoe*, the *Epic* bench trial engaged in a fact-intensive determination and found their market to be one for *US gaming transactions*. As a result, the narrow market definition contributed to the unraveling of *Epic’s* case, inhibiting it from effectively challenging Apple’s behavior.

19. *Coronavirus Reporter’s* primary market is hard to dispute: the US smartphone market, of which Apple controls 65% market share. This is consistent with Tim Cook’s own testimony.

20. This case presents a timely opportunity to efficiently curtail Apple’s unprecedented antitrust misconduct. The public interest is served by issuing a preliminary injunction without delay. This case corroborates the Subcommittee Report revelation that Apple “closely monitors the success of apps in the App Store, only to copy the most successful. Apple takes other companies innovative features.” Plaintiffs’ software products were subjected to the conduct spotlighted in the Subcommittee Report. Plaintiffs have properly invoked a tying cause of action which is the same tying scrutinized by multiple academic papers on the Apple monopoly, such as Loyola Law Review’s *Epic Games v. Apple: Tech-Tying and the Future of Antitrust*. The appropriate *per se* standard permits immediate issuance of a long overdue injunction against the App Store.

## **VENUE**

21. Venue in the Wyoming District is proper under 15 U.S.C. § 22, which states that any suit proceeding under antitrust laws against a corporation may be brought in any district where it transacts business. Apple transacts business in Wyoming. Apple's developer agreement assigns venue to CAND, and this case was transferred to this Court at Apple's request from the New Hampshire and Maine districts. The forum selection clause is itself subject to Sherman review.
22. This Court has subject matter jurisdiction, pursuant to the Class Action Fairness Act of 2005, 28 U.S.C. 1332 (d), because the proposed class of up to thirty million Apple developers exceeds 100 members, the amount in controversy exceeds \$5,000,000, and at least one member of the class of plaintiffs is a citizen of a state different from Defendant Apple, a California corporation. Jurisdiction in this Court for a permanent injunction arises under 28 U.S.C. § 1331, for federal questions presented pursuant to 15 U.S.C. § 26 (Clayton Antitrust Act). Diversity jurisdiction is invoked pursuant to 28 U.S.C. § 1332 because the parties reside in different districts and the amount in controversy exceeds \$75,000.

## **II. PARTIES**

23. Plaintiff Coronavirus Reporter Corporation is a Wyoming C Corporation. Coronavirus Reporter is also the name of the Plaintiff's iOS application, which attempted to use the national internet backbone for the first time in the history

of pandemics to allow citizens to self-report and geolocate emerging epidemiological trends. Written in February 2020, it is believed to have been the first-mover in the entire group of “COVID startups” banned by Apple on March 6, 2020. The company appointed renowned cardiologist Dr. Rob Roberts as Chief Medical Officer. Dr Roberts at all times has had full and final authority over the app, which is his medical scientific work product.

24. CALID Inc. is a Wyoming C corporation founded in 2016. Its first product was the CALID iOS App. CALID is an abbreviation for CALENDAR IDentifier. The flexible and highly functional CALID platform allows scheduling of any resource entity – which could range from its focus on telehealth videoconferencing, to a birdwatching tour. Apple denied the CALID app originally because it sought to use direct credit card payments for the rentals, which have a 2% transaction fee. Apple demanded CALID use their IAP system, which has a 30% inefficient transaction fee. CALID was approved after it implemented IAP purchases, and did conduct a modest amount of IAP sales on the App Store. CALID was forced to abandon work on the platform largely in part due to these inefficiencies. CALID paid nearly a decade of \$99 developer fees, to participate in the Apple ecosystem. CALID was subject to ranking suppression, upon information and belief because it a) wasn’t written in Swift/Xcode, which Apple uses to lock end-users into the iOS ecosystem, and b) it competed with Apple’s own apps and cronies’ apps. Despite offering a

sophisticated platform for free, the app was typically invisible on App Store searches.

25. Defendant Apple Inc. is a California corporation with its principal place of business in Cupertino. Apple designs, markets, and sells smartphones (the iPhone) and computers (the Mac), which functionally rely upon and profit immensely from access to the taxpayer-funded national internet backbone. Apple owns and operates the App Store, which serves as the only retail store for iPhone applications (apps) that execute commerce and information flow over the national internet. Because the App Store rejects some 40,000 apps per week, it causes millions of person-years of economic losses, and a vastly sub-optimal “network effect” of the Internet.

### **III. FACTUAL HISTORY**

26. Introductory paragraphs preceding this paragraph are asserted herein and responsive pleading is hereby noticed as necessary.

27. Apple operates the App Store, and has exclusive control over iOS applications and their ability to access that national internet backbone. The national TCP/IP internet backbone was built, at least in part, using taxpayer dollars for ARPANET. Apple has profited immensely from the existence of the national internet backbone. Without the internet, and the taxpayer dollars that built it, Apple would not enjoy the \$3 trillion valuation it has amassed. The Apple smartphone ecosystem is primarily a graphical user interface (GUI) software

(iOS) and hardware amalgamation connecting users to the national internet backbone.

28. Over the years, Apple has taken a concerning, increasingly authoritarian approach to the App Store and access to the iPhone userbase (the owners of the “network effect” of hundreds of millions of interconnected smartphones) and has rejected and/or disallowed significant numbers of third-party applications.

### **State of Emerging Antitrust Proceedings**

29. There exists a growing international consensus that Apple engages in anticompetitive conduct to monopolize the App Store marketplace. This is part of an emerging trend of global public interest in regulating “Big Tech.” The world rapidly adopted smartphone internet connectivity over the past decade. This has lead to vast sociological implications which we are in the very early stages of fully understanding. There are at least several emerging antitrust proceedings of particular relevance to this case, that combined form an international consensus that the App Store harms competition and innovation.

These include:

- The bipartisan Senate “Open App Markets Act” introduced in 2021 by Senior Senator Blumenthal. The Act’s Section 3(d) on “interoperability” requires the App Store allow direct app loading and eliminate search ranking self-preference. As such, the Act attempted, through legislation never brought to a

vote, to obtain the same App Store changes as the preliminary & permanent injunctions requested in this Complaint.

- The “Investigation of Competition in Digital Markets” majority staff report and recommendation by the United States House of Representatives Subcommittee on Antitrust, herein referred to as the “House report.” The facts uncovered by the House report applicable to Apple (*Exhibit A*) are hereby wholly incorporated herein. The report concludes that courts have had disregard for the legislative intent of Sherman, and too narrowly construe it in cases involving Big Tech.
- The “Executive Order on Promoting Competition in the American Economy” was signed into law by President Biden on July 9, 2021. In this order, the federal government is specifically tasked to use its statutory rulemaking authority to address “unfair competition in Major internet marketplaces.”
- A European Commission investigation into the App Store, launched in June 2020. (“The EC investigation”). Digital Markets Act legislation recently went into effect in the EU which mandates App Store modifications similar to this complaint and the bipartisan US senate bill. At time of filing, Apple engaged in malicious compliance with the DMA>
- South Korea in 2021 passed legislation requiring these same changes that are proposed in the US Senate and EU. Russia fined Apple for App Store anticompetitive behavior.

- A consumer class action antitrust lawsuit filed in 2011 alleging App Store violations of Sherman in the app aftermarket (i.e. Kodak downstream theory).

This lawsuit was incorrectly dismissed by a Northern California judge, only to be remanded eight years later by the Supreme Court. *Pepper v. Apple Inc*, 11-cv-6714-YGR. The *Pepper* case just obtained class certification, but does not protect free apps such as Coronavirus Reporter.

- A developer class action antitrust lawsuit filed in 2019 alleging App store violations of Sherman in the app distribution aftermarket. *Cameron et al v, Apple*, 19-cv-3074-YGR. The *Cameron* class is restricted to app developers who sold apps for non-zero prices. The case settled with minimal changes.

- Likewise, *Epic v. Apple*, 20-cv-5640-YGR sought such relief to permit the games developer to open competing app games stores. *Epic* obtained a guilty verdict against Apple for violating California Unfair Competition law, requiring Apple to permit developers to direct their customers to non-Apple payment pages. At the time of filing, Apple was in non-compliance with the *Epic* verdict. Specifically, the Defendant corporation engages in “malicious compliance” that is in contempt for the United State District Court’s ruling and its inherent purpose.

### **House Report**

30. The “Investigation of Competition in Digital Markets” majority staff report and recommendation by the United States House of Representatives Subcommittee on Antitrust provides compelling support and evidence supporting the

Plaintiffs and class members claims. The report asserts that Apple's control over iPhone provides it with gatekeeper power over software distribution on these iOS devices. The report declares Apple has "monopoly power over distribution of software applications on iOS devices." The report quotes Apple executives as stating that Apple is "not subject to any meaningful competitive constraint" in this channel. This results in "supra-normal" profits according to the report.

31. Apple makes \$2.7 billion annually simply from charging developers \$99 to access their platform. This fee is more than quadruple the fee of the nearest rival, and has directly harmed Plaintiffs and class members.

32. The report explains how eliminating IAP tying could be done by allowing other payment processors like PayPal, VISA, etc. to service the market. This tying has directly harmed a large subgroup of Plaintiffs and class members. Apple has recently proposed modifying IAP tying to allow email invoicing by developers. As Apple is well aware, each "additional step" in app billing algorithms reduces participation by significant amounts. Although the final mechanisms have not been described by Apple, approximately 85% of customers would still be effectively tied in to IAP under Apple's proposal.

33. Apple benefits immensely from a ranking system that favors their own rival apps, according to the report. Some searches reveal "14 Apple apps before showing results from rivals." The report documents that Apple "holds [competitor apps] to a different standard" than its own apps, which is precisely

what happened to Plaintiff Coronavirus Reporter, and other class members.

Such ranking unfairness has directly harmed Plaintiffs and class members.

34. Described is Apple's history of "closely monitoring the success of apps in the App Store, only to copy the most successful." Called "Sherlocking," Apple "takes other companies innovative features," which was the case with Coronavirus Reporter and Facetime 15/WebCaller. In sum, Plaintiffs and class members have experienced such anti-competitive behavior as described in the report.

35. The House report has an entire section devoted to Apple's "excluding rival apps." A well-cited case is Apple's exclusion of parental control and Screen Time apps. One developer is mentioned who invested almost \$250,000 in a parental control app, only to be told by Apple that this category of apps is disallowed. This pretextual exclusion is directly analogous to Apple's blanked ban of all startups from contributing to the COVID effort. Many class members have suffered the same fate, resulting in thousands of person-years and tens of billions of dollars of damages.

36. The report describes how apple has "absolute discretion" in approving apps, resulting in "complete tyranny." Just as Plaintiffs have asserted their heartbreakingly experiences being misrepresented to by junior Apple app store reviewers, the House Report goes even further. It says "different reviewers" interpret same apps "differently" with "intentionally...vague" guidelines that consist of "moving goal posts" and "unwritten rules." The report describes the

frequent delays of weeks or months (which *Coronavirus Reporter* experienced) as “insufferable.”

37. The Subcommittee exposed reports that Apple appointed two App Store employees to navigate the waters for Chinese firm Baidu, effectively giving them preferential treatment. Described is the Apple CEO’s denial of preferential treatment, followed by seemingly incontrovertible evidence the Subcommittee uncovered. As noted, *Coronavirus Reporter* and CALID never received any form of assistance for their critically important apps.
38. The Subcommittee findings re Apple’s anti-competitive behavior, detailed in Exhibit A, are hereby asserted by Plaintiffs and class members as if fully pleaded herein.

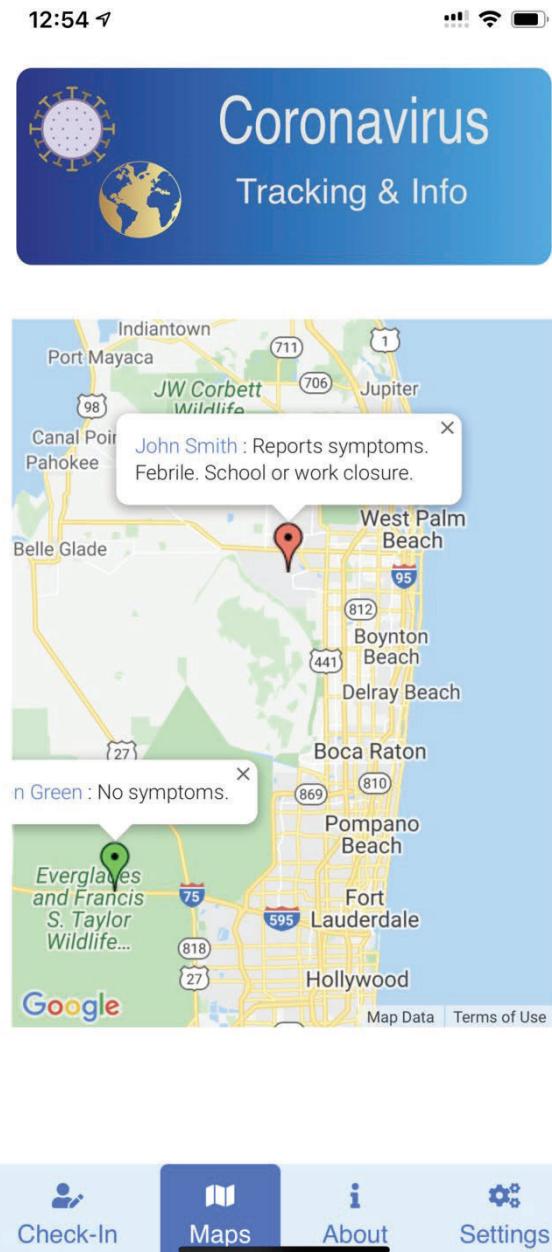
#### **Lead Plaintiff – *Coronavirus Reporter* Facts**

39. At the time Plaintiff *Coronavirus Reporter* submitted their app to the App Store, there were zero coronavirus-specific apps on the United States App Store. A keyword search for COVID or Coronavirus yielded no results.
40. Their nimble team allowed them to create the first COVID app by a world renowned researcher, and what would have been the first COVID app on the App Store. The team included NASA’s former Lead Cardiologist, as well as a front-line Emergency Room physician and a Dartmouth trained computer scientist who personally developed apps used by half a billion users. Dr Roberts had full and final authority over all functionality of the medical app, as Chief Medical Officer of *Coronavirus Reporter*. In short, *Coronavirus Reporter* was

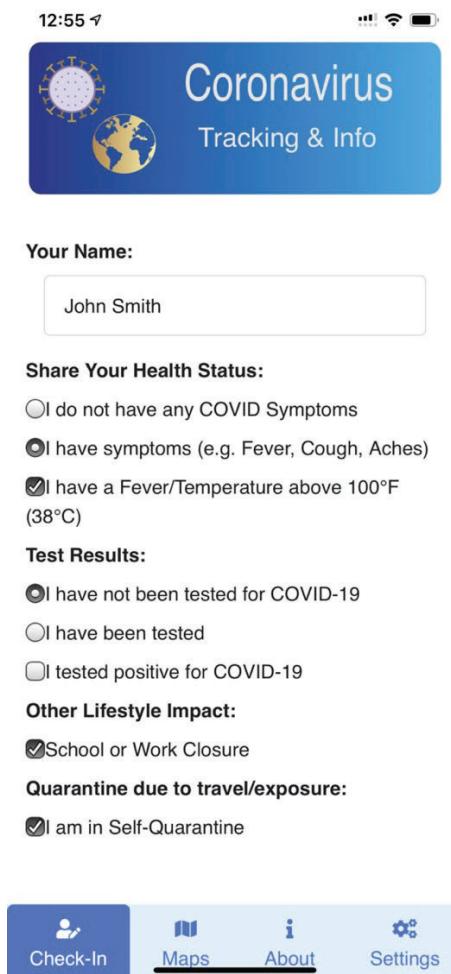
developed by a world-class medical team with specific area expertise necessary and appropriate to combine health care epidemiology research with large-scale data operations. This combined expertise would allow this startup COVID app to be first-to-market.

41. The Coronavirus Reporter app was developed in February 2020. The app team, and the application they developed, was ready for deployment when COVID was just arriving in the United States. The Coronavirus Reporter app, had it been allowed, would have provided useful bioinformatics data, as it provided a medium for open and free symptom and related information exchange by the general public. Users could submit their own symptoms, lockdown status, vaccination status (in version 2.0), vaccination details (version 3.0) and see reports by their neighbors.
42. By offering a trustworthy and direct reporting of primary source data, Coronavirus Reporter would in all likelihood have prevented substantial morbidity and mortality. Expert analysis will be presented at jury trial showing that Apple's refusal of Plaintiff's app caused no less than two-thousand deaths in the United States. Many "Covid deniers" might have concluded differently by monitoring primary source data, as opposed to "vetted" and politically influenced government and institutional data. For this reason, Plaintiffs state this was an historical app, for the first time in the history of pandemics, one could watch primary-source global data, from the convenience of their iPhone.

43. The app provided both informal location contact tracing, and pandemic situational awareness. This was implemented using a familiar and intuitive geolocation screen to report symptoms and view nearby outbreaks.

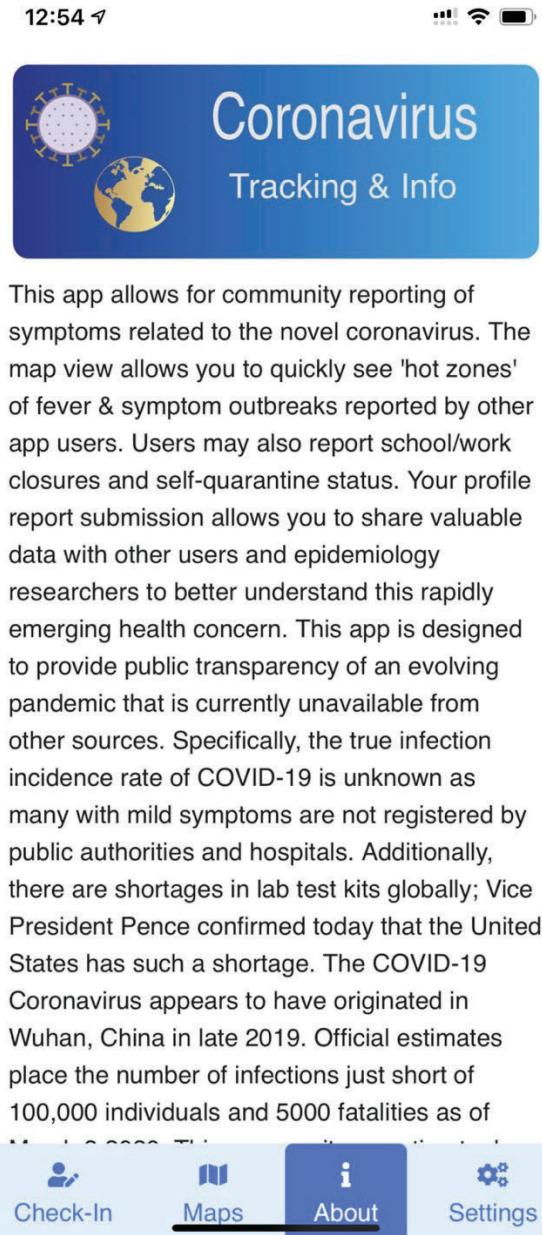


44. Little was known about COVID symptoms at the time, and the app was meant to develop with nimbleness and plasticity as situations emerged. In other words, the same skills Coronavirus Reporter employed to have the first COVID app, would allow for many future-improved versions that could advance epidemiological study of the pandemic, such as vaccination self-reporting and breakthrough case data collection.



45. The app sought user reported symptoms and COVID related questionnaire items drafted by a front-line ER physician. The public demanded this information that simply wasn't yet available from mainstream medical

institutions. In other words, a social media/crowdsourced app provided a useful tool for pandemic situational awareness in terms of real time information sharing with peers.



46. Apple rejected Coronavirus Reporter on March 6, 2020, knowing apps from large institutions and strategic partners were in the pipeline but not yet ready. Apple specifically strategized to prevent the Coronavirus Reporter app, and *all*

COVID startup firms, from setting a precedent or amassing a user base, which could jeopardize its own pipeline and/or the first-mover advantage of desirable institutional partners of a monopolistic trust.

47. In the weeks following the initial rejection, with knowledge of Coronavirus Reporter's correspondence, Apple broadened the App Store requirements for a COVID app from insurance companies to any healthcare company with deep-rooted credentials. Plaintiff told Apple in no uncertain words that permitting insurance companies, but not other companies, was absurd. Apple seems to have been embarrassed and dropped the insurance company exclusivity clause. But Apple stayed firm on banning small startup companies, favoring large institutions. Apple defined these larger institutions as "deeply credentialled," but ignored the fact that Plaintiff had a deeply-credential medical startup.

48. Medical history is plentiful with examples of startups that revolutionized medicine. In his CNBC interview, Dr Roberts cited that "Penicillin was invented by a startup, it was a two-person effort. Thankfully Apple wasn't in a position to block the invention of penicillin."

49. Despite expanding the App Store guidelines to any healthcare company, Defendant Apple denied the appeal and permanently disallowed the app on March 26, 2020. Apple internal discussions with its own partners, at the time, were already discussing their own proprietary COVID app. Apple was also looking to form partnerships with other leading institutions to develop COVID apps, that would further cement Apple's own monopolistic trust and medial

endeavors. Apple's CEO Tim Cook has widely stated that healthcare is a major focus in Apple's strategic growth. On January 9<sup>th</sup>, 2019, Mr. Cook stated that Apple's "greatest contribution to mankind" will be Apple health care products. Blocking well established medical leaders from contributing to a pandemic raises serious questions within the scope of antitrust law that shall be elucidated in this complaint.

50. Apple's twenty-day delay in assessing Dr Roberts' deep credentials suggests they struggled internally with the matter. Ultimately, Apple decided it would rather selectively choose apps that fit its own goals, even if that meant forbidding a world renowned doctor from distributing his scientific work product.

51. About one month after rejecting the app, Apple permitted several employees at a London teaching hospital to distribute a COVID app on the App Store that functioned nearly identically to Coronavirus Reporter. That competing app obtained the so-called first mover advantage, and is currently used by five million individuals daily.

52. Apple ultimately launched its own Covid app, a competing product to Dr. Roberts app. As of today's filing, four years after Dr. Roberts' app would have been available to 100% of the world, Apple's app fell well short of its goals and failed to achieve substantial results in helping the pandemic . Apple's app is built-in (bundled) with iOS and hence does not show as a typical app. But nonetheless, it is a smartphone application, despite Apple's claims otherwise.

It also requires a partnership with a government entity (i.e. any given State of the United States), to activate functionality for an end-user.

53. The Apple contact tracing app generally underperformed expectations and failed to obtain a user base in the United States. Nonetheless, research by a Turing/Oxford team into the epidemiological impact of the app suggests the UK version of the app has prevented 600,000 coronavirus cases since it was launched.

54. Coronavirus Reporter was ready months before other world-class COVID app products, and would likewise have prevented deaths in the US and other countries where the NHS/Apple app did not succeed. Deaths would have been prevented through both the informal contact tracing geolocation functionality, as well as “situational awareness” offered by the app that does not exist in the UK/Apple app. Apple’s denial of the Coronavirus Reporter app resulted in unnecessary deaths.

55. We assert this is the first time in history a corporation was able to prevent a Professor of Medicine and award winning inventor, who had saved countless lives through his MBCK discovery, from contributing to an emergency pandemic.

56. Indeed, Apple did knowingly and willfully prevent the inventor of MBCK from publishing a competing COVID app. Apple knowingly blocked a competing COVID app that covered the entire US population at least 18 months before their own bundled app.

57. Defendant Apple knowing and willfully prevented Dr Roberts, inventor of a heart attack test used by millions, from assisting citizens over the internet during the early days of the pandemic, which would have been historical. History lost an important invention, or at the very least, an attempted medical experiment never before attempted in the history of pandemics. Apple knew, or should have known, that curtailing such expert assistance could have caused increased incidence and mortality due to COVID-19.

58. Indeed, blocking all startups from assisting with COVID app development likely cost lives. The flagrant Sherman Act violation seriously, dangerously, and recklessly constrained competition – here, much needed medical innovation.

59. Apple's willful denial of Dr Roberts' medical app, and other startup COVID apps, was directly assented to by key Apple leadership, including Mr. Cook and/or one of his delegates. These leaders willfully blocked an app that would have saved lives, according to their own research in conjunction with Oxford(see below).In doing so, Apple disregarded long-established medical norms to an extent that was breathtaking.

60. Apple's App Review Board did not possess anyone with better COVID insight or credentials Coronavirus Reporter's Chief Medical Officer, though Apple acted as if they did have some sort of superior knowledge.

61. The Chief Medical Officer created work-product, the app, that could have benefitted millions. Apple used arbitrary and capricious standards to prevent that benefit from being made reality.
62. Defendant Apple stated the reason for denial was that a) Coronavirus Reporter was not a recognized healthcare entity, and b) the “user-generated data wasn’t vetted by a reputable source.”
63. In so doing, Apple was saying that citizens shouldn’t be allowed to share their symptoms of COVID, and that Dr. Roberts’ app model was inappropriate.
64. In so doing, Apple was infringing upon the right of Coronavirus Reporter, as well as ordinary citizens and COVID patients to engage in free, unrestricted commerce and information exchange on the internet.
65. Defendant Apple allowed at least two competing COVID apps from large institutions approximately three months after Coronavirus Reporter’s app was ready. This caused Coronavirus Reporter to lose the valuable first-mover advantage of an internet app.
66. Apple allowed a similar British app from Guy’s St Thomas’ hospital to enter the App Store. Although it was sponsored by an institution, the app was primarily the work-product of several individuals, as was the Coronavirus Reporter app. This app quickly achieved millions of users a day. Had Coronavirus Reporter been rightfully approved, the app would have received a significant share of the volume that went to competitor apps.

67. In a second example of their breathtaking arbitrary standards, Apple did approve a fledgling Florida startup's COVID app. As the House Report determined, often Apple interprets its own guidelines incorrectly or inconsistently. As other app teams have experienced, often cronyism takes place where Apple allows their own friends and app teams known to them to violate their own guidelines, which appears to be what happened in this case of a startup being permitted to launch a COVID app with a Chief Medical Officer that did not possess the qualifications of Dr Roberts. That startup did not have a large-scale big-data computer scientist from Dartmouth, as did Coronavirus Reporter, which had written apps that served hundreds of millions users.

68. Allowing the aforementioned competing apps, but disallowing Coronavirus Reporter, and most all other COVID startups was intentional, flagrant restraint of trade. Apple effectively controls internet access to more than half of the United States population.

69. By disallowing Coronavirus Reporter and partnering with a rival to provide a COVID app that ultimately failed its objectives, Defendant Apple's monopolistic practices caused a permanent loss of valuable epidemiological bioinformatics data. This loss extends to eighteen months, and is void of any data during the three months when no competing apps existed in the US marketplace. Valuable epidemiological data was forever lost during that duration.

70. Native apps are favored by customers by almost 90% over web browser apps.

Native apps provide more functionality, some of which is critical with a Covid app. As such, “smartphone enhanced internet commerce and information flow” requires access to the app SDK, rather than mere web browser experience, because GPS, altimeters, and other devices cannot be reasonably accessed without native app permission. Apple’s competing Covid app uses native app functionality, and Dr Roberts would have been severely disadvantaged to rely on a web browser with limited-to-none SDK access.

71. As such, Apple exercises a *de facto* monopoly of access to the national internet backbone, or at least, the smartphone enhanced functional internet backbone and iOS userbase. The collective network of hundreds of millions of smartphone devices – including their sophisticated sensors – is simply not Apple’s property. It is the property of the users, the general public, and should exist as a “common carrier” free from Apple’s control.

72. There exists tens of millions of individuals in the United States who do not know how to access the internet without using an iPhone device. These individuals rely upon access to the internet to perform critical commerce activity, engage in protected free speech, and obtain lifesaving medical advice and treatments.

73. Coronavirus Reporter had ongoing ideas for its product, such as vaccination data, that of course were not possible in their version 1.0 product for February

2020 release. Ongoing harm to the company and the general public is caused by Apple's refusal to allow the team to publish their work.

74. There was no reasonable grounds for Apple to deny the Coronavirus Reporter app, and all other COVID startups for public distribution. This represented damage to an entire market of COVID startups – not directed damage to one company.

75. Dr Roberts was interviewed by CNBC on January 28<sup>th</sup>, 2021 about Apple's refusal to publish his Coronavirus Reporter. Despite his public disclosure of Apple's misconduct, the company refused to alter their anti-competitive policies, and therefore prevented a version 2.0 of the Coronavirus Reporter from being launched in 2021, as well as a vaccine data collection emphasis in version 3.0.

76. His statements in that interview are asserted as true to the best of his knowledge and belief. In summary, he stated:

1. The app was designed to be a large-scale, supervised epidemiological study, the first of its kind in such an historic pandemic.
2. He invented the MBCK gold standard screening test for heart attacks, used for over three decades. Thus he had particular experience to supervise such an immense screening effort.

3. He was “taken aback,” in his own words, when Apple announced they were refusing his app for lack of deep-rooted medical credentials.
4. Dr Roberts discovered numerous heart attack genes, was CEO of a major Heart Institute, personally signed off on John Glenn’s space flight, authored medical textbooks, and directed the Nobel prize committee for mathematics. In his words, if Apple said he lacked “deep rooted” credentials for a COVID app, who was safe from Apple?
5. To the extent Apple attempts to portray a startup as distinct from his own credentials, Roberts dismissed that with a historical perspective. Penicillin was invented by a “startup” with deep-rooted medical credentials, as were many of the most important inventions since the Industrial Revolution. In short, for Apple to claim an institution has some unique ability to contribute to medical science, that an individual startup lacks, is not historically accurate.
6. Roberts asserted that society lost from Apple’s refusal, in that critical epidemiological data was forever lost.
7. Roberts brainstormed that the app might have helped him elucidate long term cardiac complications of COVID.

8. Roberts stated that, though he is not a lawyer, he doesn't feel Apple should be allowed to do what they did.

### **Lead Plaintiff – CALID Inc. Facts**

77. CALID was launched as a cross-platform scheduling platform with an initial focus on telehealth. It was four years ahead of its time, as the telehealth industry took off just in the past year as a result of the pandemic.

78. Apple initially rejected the CALID app, claiming it didn't provide any "smartphone enhanced" experience, i.e., no "added functionality" in comparison to a basic website. They also rejected the app because it didn't use IAP purchases.

79. CALID offered iOS users WebRTC videoconferencing on top of a flexible scheduling platform. This was not available on Safari at the time. This itself evidences Apple's desire to 'lock in' users to the iOS ecosystem and restrict access to the Google-developed WebRTC platform.



## ABOUT CALID

**CALID.com is an online marketplace platform that allows people to meet online, learn about each other's offerings, and subsequently book appointments directly with one another. Members who join CALID.com are able to host listings, to sign up for and schedule appointments, or both. A listing on our site is also referred to as a CALID, aka Calendar Identifier. You can think of a CALID as a social media page, but in addition to traditional social media pages which have photos and text, a CALID page also allows scheduling. Members may have as many CALID listings as they have skills to offer or things to rent. A CALID listing can exist for practically anything that can be scheduled -- including services (eg lessons, outdoor activities, expert consultations) and rentals (eg cars, houses, computers, equipments).**



## Explore a world of CALIDs

Discover activities and cultural excursions in your hometown - or across the globe. CALID's scheduling system works seamlessly between time zones, allowing for powerful yet easy-to-use global scheduling. CALID's listings marketplace is as diverse as its user base. Join today and contribute to our unique social platform.



## Foster eco-efficiency

CALID was founded with a vision of fostering ecological sustainability. Our Founders believed that creating a system that encouraged *sharing* would translate to reduction in unnecessary resource use. The greater the participation in CALID, the better the economies of sharing and resource savings. Videoconferencing is available as an option on any CALID reservation, further reducing unnecessary travel. We depend on members like you to create thoughtful listings to further these goals.

Carrier 10:39 PM

## CALID Videoconference

[Close](#)



**CALIDs Registered to James B.**

Listed below are all scheduleable resources (i.e. activities, expert consults, items for rent...) that you have registered on calid.com

BondBirdTours [Edit](#) [Preview](#)

Birdwatching Adventure in the Amazon Rainforest Hosted by Expert Ornithologist, Dr. Bond



**Date Created:** 2017-03-05 23:54:44  
**Number of Views:** 0000000075  
**Booking page:** [www.calid.com/BondBirdTours](http://www.calid.com/BondBirdTours)

[Active](#) [Inactive](#)

Carrier 10:36 PM

### RATES & RULES

Hourly Rate: USD \$24.00  
Daily Rate: USD \$65.00  
Monthly Rate: USD \$950.00

**Booking rules:** Rates include meals and boarding.

[BOOK RESERVATION FOR BONDBIRDTOURS](#)

Select a start & end time and go!

Start

End reservation

[✓ Reserve](#) [Cancel](#)

[PHOTO GALLERY](#)



80. Apple agreed that CALID offered something beyond a basic website, and approved CALID for distribution once IAP was added. This resulted in users having a 40% commission loss (30% to Apple, and 10% to CALID). CALID abandoned the platform, as it felt the 40% friction made it unethical and untenable to most practitioners.

81. CALID Inc. had deep medical credentials, and notified Apple of these credentials when it submitted “Coronavirus Reporter” on behalf of Dr. Roberts’ team, which had not had time to incorporate their own business entity. As such, under a “*force majeure*” pandemic situation, CALID offered assistance to Coronavirus Reporter Corporation to bring their app to the public, temporarily under their business name.

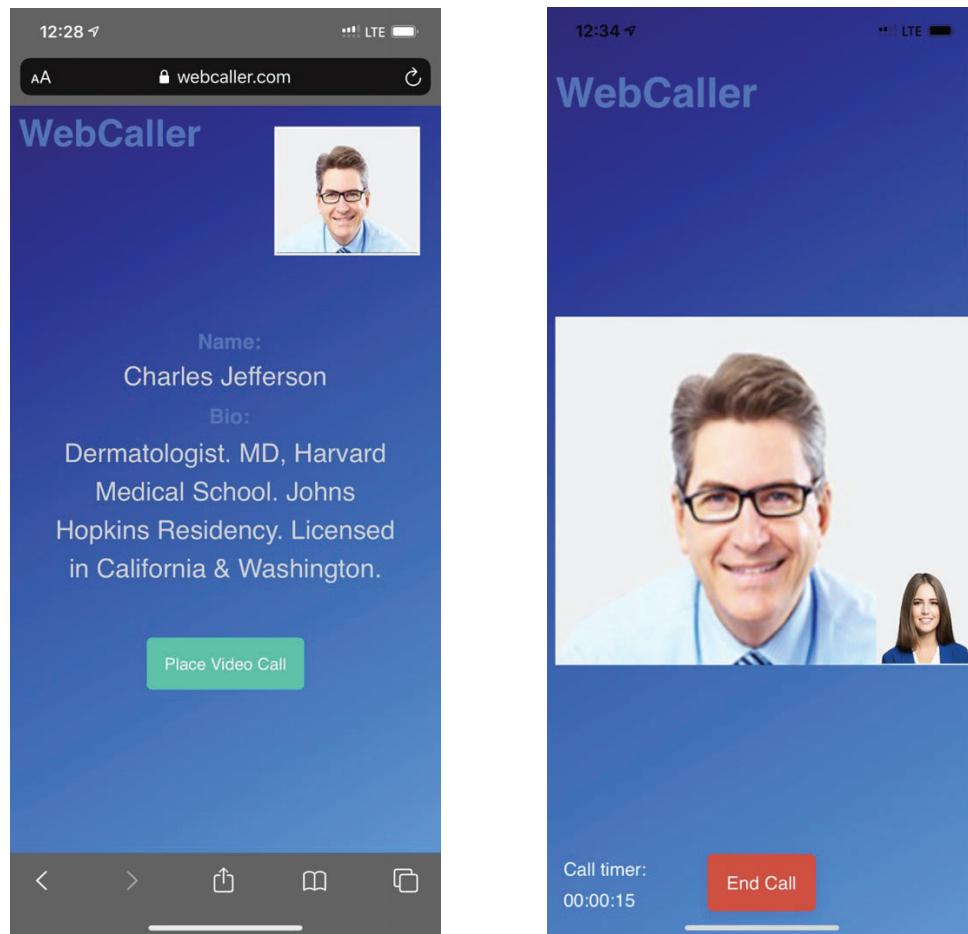
82. CALID had managed FactMed, a website focused on FDA side effects, since 2016. FactMed had tens of millions of users, and 80 million FDA side effect profile reports. Generating these FDA data summaries required lengthy computational work by high powered servers. In short, FactMed was “big data” and “big medical data,” and offered invaluable access and summary to complex FDA side effect profiles.

83. Dr. Roberts, by temporary measures described above, served as Chief Medical Officer of CALID, pending incorporation of Coronavirus Reporter.

84. Two additional physicians participated in this project, a front-line ER doctor and an aspiring neurosurgeon and as such, CALID had deep rooted medical

credentials covering Big Data, Patient Safety, Telehealth innovation, and of course, Dr. Roberts' notable global contribution to cardiac health.

85. CALID Inc. also published WebCaller, a cross-platform videoconferencing utility. Unique to WebCaller, it provided “weblinks” to WebRTC sessions. This meant anyone could join a videoconference – on any platform – with no special add-ons or software. This was a couple years before the “zoom” revolution of the pandemic. In fact, Zoom still requires special software, and competing projects by Microsoft, Amazon, and Google use WebRTC weblinks almost exactly as specified by WebCaller, with final products that look very familiar to WebCaller, which preceded them by several years.



86. But Apple had suppressed WebCaller for two years, and it only attained a handful of downloads despite being one of the first cross-platform, easy to use WebRTC interfaces. The industry grew by tens of billions of dollars over those years, and Apple just last month introduced FaceTime 15 – with the same exact weblink features WebCaller perfected years earlier.

87. Apple suppressed WebCaller because it competed with Facetime, because it wasn't written in Swift, and because its cross platform emphasis negated iOS "lock in" techniques. In short, WebCaller was subject to "Sherlocking" as described by the Subcommittee.

### **A Compelling Pattern of Technical Pretenses**

88. The above Plaintiffs each endured conduct directed at them by Defendant Apple that caused loss of substantial years of their work. Their five apps were blocked or rank suppressed, causing them each to lose valuable income. Moreover, the competition in their industry – the Smartphone App Market – caused similar losses to the smartphone user and the economy as a whole.

89. It is rather striking that over the last decade we, as a society, let Apple take away these rights for us to choose what sorts of programs we could run on computers (i.e. smartphones) that we paid for. This is analogous to purchasing a TV and only being allowed to watch films approved by that TV manufacturer. Or buying a car and being told by the car manufacturer what neighborhoods it can be driven to. We trusted Apple because we trusted the genius of Steve Jobs and Wozniak. Enthralled by the great advancement of the "smartphone

enhanced Internet,” we assumed dedication to technological progress and American freedom were inherent goals of Apple. Unfortunately, Apple today has become the single greatest threat to free enterprise and technological progress. Lives were lost by the delay in rolling out critically needed COVID-19 software. This is the right time and place to end Apple’s practices, like over thirty other countries have done or are prepared to do.

90. Apple possesses vast userbase studies. Consumer willingness to pay and ability to switch platform studies exist at Apple, Inc. Included in these studies, are evidence of the barriers and difficulties their users would face in accessing the internet without their Apple device. For example, a user who purchased a \$1000 iPhone on a financing plan may not have the financial means to access the internet with an alternate device. Apple has substantial investments in cost-analysis literally tracking every penny its users does and can spend. From these vast economic studies, Apple knows it holds monopoly like power over many users’ ability to exit the Apple ecosystem and access the internet through other means.

91. All of the aforementioned examples restricted output, quality, and innovation in the Smartphone App market for US smartphone users. This epitomizes antitrust injury. Not only are developers harmed, but so are consumers, by a censored pool of apps and reduced incentive for developers to innovate. We expect many more stories to emerge as Plaintiffs’ first discovery request to

Defendant Apple will be a list of every rejected app team and supporting documentation.

92. The apps are, in fact, disallowed to foster Apple's monopolistic goals, rather than the pretextual claim of protecting the public from low-quality or illegal applications. Upon information and belief, Apple routinely employs cronyism when it allows one developer's app, but disallows similar apps from other developers.

93. Historically, most internet applications were free and open-sourced, under the MIT/GNU software licensing paradigm. In the past decade, Defendant Apple has drastically changed the free, open internet to one of massive, trust-like corporate profits and control. This has encouraged addictive apps and other unhealthy patterns. It has also effectively killed the open source movement and Web3 blockchain app technologies. Prompt enforcement of Sherman Act will reign in a whole new cohort of improved apps, transparency, and technologies.

### **Sherman Antitrust Claim Theory**

#### ***A Relevant Market Exists for US Smartphones***

94. There is a relevant market for United States smartphone internet access devices ("US Smartphone Market") which encompasses the ubiquitous handheld, portable electronic devices that allow users to perform myriad communications and computing functions, such as browsing the internet, navigating traffic, paying bills, accessing social media, playing games, and

streaming videos and music. For many consumers, smartphones have largely replaced laptop and desktop computers for a wide variety of computing tasks. To be useful, a smartphone requires an FCC licensed telephone modem (i.e 5G radio) and an operating system which facilitates the use of apps through code, such as application programming interfaces (“APIs”), which app developers use to create apps that are compatible with the device. Smartphones in the US are made by companies like Apple, Samsung, LG, and Motorola. Apple’s products are unique in that they don’t have a licensable operating system, rather, they use the proprietary iOS. Smartphones are designed to work on specific frequencies, which vary by country, and hence require regulatory (i.e. FCC) approval.

95. Hence, licensed US smartphones operate using carrier frequencies that have been commissioned in this country. Apple iPhones sold in the US have different product SKUs than those sold in China, or Europe, evidencing the different markets for different country-products. The US smartphone market excludes simple cell phones, “flip phones,” or feature phones, or other electronic devices (such as laptop computers, desktop computers, and gaming consoles, e.g., Nintendo DS, Xbox, PlayStation) that are not mobile smartphones. As such, Apple and several Android OEMs (LG, Samsung, Motorola) comprise the bulk of the substitutable products in this market. Tablets are considered distinct from this smartphone market.

96. Smartphones are essential tools in contemporary American life. They are indispensable to consumers for personal communication, as well as for access to and participation in the modern economy. What makes a mobile device "smart" are the numerous apps that can run on the device and are compatible with its mobile operating system. U.S. consumers now spend more time using mobile devices than they do desktop computers, laptop computers, or televisions. Mobile internet usage is rising while desktop internet usage continues to fall, and U.S. consumers spend nearly 90% of their mobile internet time within apps instead of mobile browsers and thus prefer native apps. They also spend over \$32 billion a year purchasing apps and digital content within apps. App developers likewise invest hundreds of millions of dollars to build and distribute apps for smartphone devices. However, for the reasons to be expounded at trial, such as work/family compatibility, financial constraints, and others to be revealed in discovery, the smartphone market has high barriers to user switching and to market entry. Large companies such as Microsoft and Amazon have attempted to enter and gain viable scale in the market, with only very limited success. As such, Apple currently possesses durable monopoly power in the market for US smartphones, estimated at over 75% by revenue or 65% by quantity.

97. In the face of a small price increase (or a small reduction of quality) in smartphone prices, a consumer would be highly unlikely to switch from an Apple device to a substitute for the following reasons. First, the consumer who

would switch would lose much of her financial investment in the previously purchased devices—often hundreds of dollars—as well as digital content consumable only through iOS apps. The consumer may also lose efficient, or any, access to many kinds of data on that device or data associated with those apps. Because of the functional and data integration between devices within the same ecosystem many consumers owning multiple Apple devices would be reluctant to switch to an Android device unless committing to switching all devices—a significant financial commitment. Third, many Americans pay for their devices under installment contracts, limiting their ability to switch mobile ecosystems. These and other costs of switching smartphones cause “lock-in” to the Apple ecosystem, and this leverage is used to exploit further downstream markets.

98. Because of this leverage, Apple likewise has monopoly power in all of the downstream, related, and tied product markets to the US smartphone market, which could be considered the “foremarket.”
99. In the US Smartphone market, the United States is the relevant geographic market. As stated, FCC approves a US-version of the iPhone. Apple’s product SKU numbers recognize that this is a distinct market geography.

***There exists a relevant Sherman Market for US Smartphone App Distribution Services (“App Stores”)***

100. There exists a relevant market for US Smartphone App Distribution Services, which sell or otherwise provide apps for installation to users in the

aforementioned US smartphone market. Hence it may be considered a related, downstream, or after market to the US Smartphone foremarket, based upon a jury's Brown Shoe fact-finding.

101. To benefit fully from their smartphone, owners install apps written by third-party developers, which provide added functionality. The apps may be work utilities such as word processors, banking tools, references like encyclopedias, games, home alarm systems, health monitoring systems, and so forth.

102. Within this market, the Apple App Store handles over 80% of smartphone software sales and distribution as measured by profit. Alternatives to the App Store are Google Play, Microsoft Store, and some third-party jailbreaking products like Cydia. Additionally, developers like Plaintiffs can easily offer software distribution websites that would compete as an App Distribution Service, but for Notary Stamp requirements.

103. Traditional brick-and-mortar software stores were the primary App Distribution Service for All Historic Computing Platforms until the advent of the Smartphone. Brick-and-mortar Smartphone App Distribution Stores could be a part of this relevant market, except Apple's notarization requirement disallows them. Hence in reality today, there is no brick and mortal component to this market, but there could be, in a theoretical open market. This market is hence for digital app stores, but a jury, engaged in Brown Shoe fact-finding,

may take into consideration historical brick-and-mortar stores, and may conclude they are, or should be, a part of this market.

104. An app distribution service (whether for smartphones, or historic all computing platforms) typically has a retail store front, and an institutional purchasing side that buys from software developers.

105. Typically, consumers do not pay for Smartphone App Distribution Services directly, it is a zero-priced service product where consumer's choice of service depends upon factors like quality of selection and convenience, rather than price. The App Store is installed free on all iPhone smartphone devices, and Google Play is installed free on all Android phones. Hence there is no traditional elasticity of demand for these service-products, because there is no price delta denominator. A jury may even find this is to be a single-brand downstream market, as they did in *Epic v. Google*. For initial pleading purposes, and because Apple holds an 80% share, it suffices that the alleged market is for all US smartphone app distribution services.

106. Competitors in this market earn profit by charging a commission on software sales or monetizing user attention. An inefficiency in this market, i.e. where there was one monopoly seller of apps, or monopsonist buyer of institutional apps, could create a dangerous scenario where consumers pay supra-competitive rates (such as 30%) on a bottlenecked offering of software.

107. US Smartphone App Distribution Services additionally distribute free apps, which consumers use to carry out daily tasks of life. An inefficiency in

this market could create a dangerous scenario whereby a monopolist-monopsonist could censor and control essential life tasks through restrictive conduct. Smartphone App Distribution Services may be referred to as “app stores,” “software stores,” “app distribution points,” and “retail side of app market” for contextual clarity.

### **The Relevant Geographic Market is the United States**

108. The United States is a relevant geographic market for US Smartphone App Distribution Services. The apps available, and desirable, to consumers vary on a country-by-country basis. For instance, app stores frequently have country-specific “storefronts,” and U.S. consumers cannot access the storefront available to users in another country. Apple also sets certain app distribution and payment requirements for developers on a country-by-country basis, including in-app sales currency and price range requirements. Legal restrictions on apps vary by country. In this light, and due to language and cultural differences, and regulatory requirements, App distribution services available in other countries are not reasonable substitutes for app distribution services in the United States.

### **There is a relevant Sherman market for US Smartphone Apps (“software”)**

109. To be useful to consumers, a smartphone must be able to run software applications, or “apps.” The app market may again be considered related and/or downstream to the US smartphone foremarket. Apps let users perform most of

the functions associated with mobile devices—tasks like navigation, web browsing, ordering groceries, playing games, and communicating through email and text messaging. A mobile OS facilitates the use of apps through code, such as application programming interfaces (“APIs”), and SDKs (“software development kits”) which app developers use to create apps that are compatible with the OS.

110. Apps may be free or may be a non-zero price to consumers, but even a free app has a wholesale valuation. Analogously, every film has a price sold to a film studio. A made-for-TV show, free through ad sponsorship or unlimited streaming agreements, has a price paid to its creators by the TV network or streaming service. Likewise, an author is paid for book rights by a publishing house. Apps are thereby priced by either their cost to consumer, or their total net valuation paid to a creator-developer. This market pertains to the work-product value of the app collectively, and hence emphasizes apps by their total, non-zero valuation. A jury during Brown Show factfinding may reasonably focus on the consumer value of apps individually, which are free in this case.

111. The vast majority of apps are free, such as Facebook, Instagram, Snapchat, Google Search, etc. Defining a relevant market for free apps has been a “challenge,” according to an authoritative “*Antitrust and Big Tech*” report to the United States Congress (full report, incorporated herein by reference, available at <https://sgp.fas.org/crs/misc/R45910.pdf>). As the report explains:

“[Antitrust experts] maintain that antitrust law has an important role to play in zero-price markets. Some of these commentators have argued that zero-price transactions are not in fact “free” to consumers, and that consumers ultimately “pay” for putatively “free” goods and services with both their attention and personal data. According to this line of argument, many of these consumers may actually be *overpaying*. That is, some observers have argued that certain “free” products and services may have *negative* equilibrium prices under competitive conditions, meaning that firms in the relevant markets would *pay consumers* for their attention and the use of their data if faced with sufficiently robust competition.

Other commentators have argued that firms offering zero-price products and services can compete on a variety of nonprice dimensions such as quality and privacy, and that antitrust law can promote consumer welfare in zero-price markets by ensuring that companies engage in these types of nonprice competition. This argument appears to have persuaded regulators at the DOJ. In a February 2019 speech, Makan Delrahim—the head of the Justice Department’s Antitrust Division—contended that antitrust law applies “in full” to zero-price markets because firms offering “free” products and services compete on a variety of dimensions other than price.

While many observers accordingly agree that zero-price markets are not categorically immune from antitrust scrutiny, the optimal approach to defining the scope of such markets remains open to debate.

Some commentators have argued that regulators should modify the SSNIP test to account for *quality-adjusted* prices, creating a new methodology called the “small but significant and non-transitory decrease in quality” (SSNDQ) test. According to these academics, decreases in the quality of “free” services (e.g., a decline in the privacy protections offered by a social network) are tantamount to increases in the quality-adjusted prices of those services. Under the SSNDQ test, then, a firm offering “free” goods or services would possess monopoly power if it had the ability to profitably raise its quality-adjusted prices significantly above competitive levels... The SSNIP test as traditionally administered is accordingly “inoperable” in a number of zero-price technology markets.”

112. Plaintiffs intend to present at jury trial SSNDQ tests from experts to demonstrate that free apps are a relevant market with respect to consumers.

Alternatively, the “*Brown Shoe*” test may be inapplicable to free digital goods, requiring the Court to revert to the original language of the Sherman Act, and/or develop a “modified Brown Shoe” test. Plaintiffs will similarly prove the wholesale, “work-product” value of apps. Hence a jury will be informed of all possible valuation metrics with regard to the market for US Smartphone Apps.

113. There is no direct symmetry in transactions or valuation between the demand and supply side of apps. Apple could, and indeed did, purchase a weather app for millions of dollars from a developer, but then distributed it for free. In short, an app has a work-product valuation by its author – often in excess of millions of dollars – and a demand price by consumers – often free, or a small amount. Apple is the only merchant of record selling iOS apps to consumers – all App Store purchases show as “Apple Inc” on credit card receipts. As such, Plaintiffs allege apple is a monopsony purchaser of US smartphone apps, at least on the retail side.

114. In sum, there is a relevant market for US smartphone apps. The market is subject to bottleneck constraint, as Apple is the only purchaser of iOS apps. This creates substantial antitrust injury in the form of censorship, limited availability, and reduction on quality and competitiveness of apps to consumers, and in compensation to developers for their work-product.

### **The Relevant Geographic Market is the United States**

115. The United States is a relevant geographic market for Smartphone Apps/ The apps available, and desirable, to consumers vary on a country-by-

country basis. Apps are made in different languages and cultural norms to appeal to different countries. Some apps are restricted or illegal in certain countries. Localization, such as currency and time and date formatting, vary by country. A US developer may not want divert limited resources and budget to making an app work in every country, and as a solution, typically will write their app in American English, intended for a United States audience. The developer may value their app solely on the expected revenue to be obtained from US based consumers.

**There is a relevant Sherman market for iPhone Notary Stamps**

116. Due to hardware constraints implemented by Apple, software may only run on iPhones that has a “mark” of notarization approval by Apple. This is a digital product, essentially invented by Apple. No other significant computer platform in history required a notary stamp from the manufacturer to run software. This is the main mechanism whereby Apple censors and limits software distribution and choice, and creates an antitrust injury.

117. Apple has, since about a year after the release of the iPhone, required notary stamps and charged developers and consumers for them, indirectly. The stamps are purchased through Apple’s \$99 developer fee, and their 30% commission on app sales.

118. Undersigned counsel first invoked this theory in 2021, when sales of notary stamps were indirect. Notably, in 2024 it became apparent Apple was willing to, and does now charge directly for notary stamps. This is evidenced

by the fact that their “malicious compliance” with the European Digital Markets Act turns on their direct charges to developers for notary stamps. Even worse, Apple charges European developers annually for these developer stamps, again essentially maintaining full power and censorship authority over consumer apps.

119. Charging for notary stamps is particularly pernicious conduct and has little historical basis. It would be akin to a TV requiring manufacturer approval to watch each film, after a consumer rightfully purchased the TV. Hence notary stamps evokes “Big Brother” authoritarian connotations of censorship and control.

120. The citizens of our country have invested around a trillion dollars in the iPhone “network effect” which forms an essential part of daily life and commerce. Vast functionality in this network effect is possible, given its inherent, combined computing power and communications. Unfortunately, the executor of these network computations and communications – the app – is subject to an availability bottleneck. Apple must issue a “notarization” or digital encryption signature, in order for an app to launch and access this network. Apple is the sole producer of these notarization stamps. A citizen trying to use an app made by a developer is unable to do so without a notarization stamp from Apple. Apple issues these stamps to developers and ultimately end-users using the App Store Connect developer portal, which has a \$99 annual fee to each developer. Additionally, Apple requires the developer

to sign a contract of adhesion – the DPLA – granting Apple purported full discretion as to whether or not to issue the stamps.

121. Alternatively, a jury engaged in Brown Shoe fact-finding may find an independent market for userbase access rights to the US smartphone. Apple charges developers \$99 for these partial, limited access rights. The nearest competitor, Android, charges \$29 annually for rights, and offers a free bypass sideloading way for developers to reach their audience. Hence based on discovery and evidence available, a jury may find notary stamps are part of, or independent from userbase access sales to developers.

122. This itself is indicative of anticompetitive restraint in the market, as pointed out by the Subcommittee. There is simply no way for a developer to access the Smartphone userbase (including their GPS, and all other low-level SDK calls, unavailable on a simple browser, which itself is strongly disfavored by users). A developer who foregoes Apple misses out on 65% the market – and 80% of ‘app spending’ capability. Dr. Roberts’ app wouldn’t have been scientifically valid, if it only accessed half the country’s smartphone users. Other Plaintiffs would not, and did not, achieve critical mass for app success.

**The relevant market for iPhone Notary Stamps is the United States**

123. As discussed above, Apple sells notary stamps directly in the European Union. Hence the exact digital form of notary stamps, and pricing and

distribution thereof, varies by legal jurisdiction, so an appropriate relevant market for this Complaint is the United States.

### **Apple Has Monopoly Power in the US Smartphone, App Distribution Services, and App Markets**

124. Apple possesses a durable monopoly and monopsony in the US Smartphone App Market and US App Distribution Services Market, causing ongoing harm to competition and injury to consumers, developers, and distributors. Apple's monopoly power is evidenced by its ability to totally censor and control the apps that may be used on the iOS device network, and to charge 30% supracompetitive commissions on distribution services and/or notary stamps. Apple uses monopoly power in the US Smartphone market, where it holds 65% market share, to engage in exclusionary conduct and deny essential facilities to rivals, in violation of *MCI* and *Aspen* precedent. It routinely grants preferential treatment to its own apps, or those of its cronies and business partners.

125. Through its anticompetitive conduct, Apple blocks any app from being directly installed on devices. Nearly every other major computing platform in history, notably including MacOS and Android, allow apps to be directly loaded and installed on devices. The App Market is severely bottlenecked as a result.

126. Consumers are harmed by Apple's anticompetitive practices by way of increased prices and reduced output. Apple rejects 40,000 apps per week, representing millions of hours of lost labor. In China, where Android markets

thrive, the output of competing Android app stores are nearly an order of magnitude higher than Apple's respective app market.

127. In addition, developers are harmed by Apple's conduct. The Subcommittee Report describes in detail such harms, such as "Sherlocking", and that report is referenced and incorporated here as antitrust injury evidence. Since Apple is the only distributor of apps – it may act as a monopsony – developers of free apps are underpaid for their work, or entirely censored and paid nothing. Apple would pay zero to Plaintiff for their app – a novel distribution app store that would run, as a standard app on an iOS device. It is well known Apple's DPLA doesn't allow competing app stores, as such, Plaintiff does not need to apply to join the DPLA, which would simply move this dispute to the Ninth Circuit and prevent redress from ever occurring.

128. Developers are damaged through lost opportunities to get paid for their work. Like Plaintiffs, they created apps of substantial value, but were paid a price of zero by Apple – in the cases of disallowance or ranking suppression. As a monopsonist, Apple had full say in setting this zero price, which stifled innovation and excluded rivals. In the case of Coronavirus Reporter, either monopoly or monopsony theory applies in that prices were artificially manipulated by Apple, Apple benefitted through their own apps, and the consumer lost. For example, Coronavirus Reporter may have offered a free app, sponsored through partnership with Pfizer or Moderna for vaccine information. For users who wanted a truly independent app only representing

Dr. Roberts medical expertise, a minimally priced paid app would have been reasonably offered. Intangible benefits to app publishers include brand goodwill, partnerships (e.g. vaccine producers, physician networks), and advertising assignments. Apple's own apps benefit from these, especially brand goodwill. As a monopsonist buyer, when Apple blocked an app like Coronavirus Reporter, it effectively paid the developer zero, reaping the brand goodwill and finite ad revenue for its own rival apps. As a monopolist distributor, Apple held an excessive IAP rent, charged developers \$99 unnecessarily, and excluded competition – here, all startup COVID apps. These are illustrative examples only, but suggest likely and common scenarios that applied to all Plaintiffs and class members.

### **Putative Class Definitions**

129. Plaintiffs bring this proposed class action pursuant to Fed. R. Civ. P. 23(b)(1), (2), and (3).

130. Plaintiffs bring this action on behalf of themselves and the following nationwide class, for monetary and injunctive relief based on violations of the Sherman Act:

*All U.S. Smartphone developers of any app that was excluded through disallowance, censorship, and/or ranking suppression on the App Store.*

131. Not included in this proposed class is the defendant; defendant's affiliates and subsidiaries; defendant's current or former employees, officers,

directors, agents, and representatives; and the district judge or magistrate judge to whom this case is assigned, as well as those judges' immediate family members.

132. Plaintiffs also bring this action on behalf of themselves and the following nationwide class, for monetary and injunctive relief based on violations of the Sherman Act:

*Any US Smartphone developer who paid a \$99 annual subscription fees to Apple for access to its userbase and/or app “notarization.”*

133. Not included in this proposed class is the defendant; defendant's affiliates and subsidiaries; defendant's current or former employees, officers, directors, agents, and representatives; and the district judge or magistrate judge to whom this case is assigned, as well as those judges' immediate family members.

134. **Numerosity:** The exact number of the members of the proposed classes is unknown and is not available to the plaintiffs at this time, but upon information and belief, supported by Apple's past statements, the classes will consist of approximately two million iPhone developers, and therefore individual joinder in this case is impracticable.

135. **Commonality:** Numerous questions of law and fact are common to the claims of the plaintiffs and members of the proposed classes. These include, but are not limited to: a. Whether there is a U.S. market for smartphones; whether there is a U.S. market for apps and app distribution services; c.

whether there is a U.S. market for iPhone notary stamps, d) Whether Apple has unlawfully monopolized, or attempted to monopolize, the above markets, including by way of the contractual terms, policies, practices, mandates, and restraints described herein; d. Whether competition in these markets has been restrained and harmed by Apple's monopolization, or attempted monopolization, of each market; e. Alternatively, whether Apple has behaved as a monopsonist, or attempted monopsonist, in the wholesale app markets; f. Whether plaintiffs and members of the proposed classes are entitled to declaratory or injunctive relief to halt Apple's unlawful practices, and to their attorney fees, costs, and expenses; g. Whether plaintiffs and members of the proposed classes are otherwise entitled to any damages, including treble damages, or restitution, and to their attorney fees, costs, and expenses related to any recovery of such monetary relief; and h. Whether plaintiffs and members of the proposed classes are entitled to any damages, including treble damages, or restitution incidental to the declaratory or injunctive relief they seek, and to their attorney fees, costs, and expenses related to any recovery of such monetary relief.

136.       **Typicality:** Plaintiffs' claims are typical of the claims of the members of the proposed classes. The factual and legal bases of Apple's liability are the same and resulted in injury to plaintiffs and all of the other members of the proposed classes.

137.     **Adequate representation:** Plaintiffs will represent and protect the interests of the proposed classes both fairly and adequately. They have retained counsel able to engage, and experienced with, complex litigation. Plaintiffs have no interests that are antagonistic to those of the proposed classes, and their interests do not conflict with the interests of the proposed class members he seeks to represent.

138.     **Prevention of inconsistent or varying adjudications:** If prosecution of a myriad of individual actions for the conduct complained of were undertaken, there likely would be inconsistent or varying results. This would have the effect of establishing incompatible standards of conduct for the defendant. Certification of plaintiffs' proposed classes would prevent these undesirable outcomes.

139.     **Injunctive and declaratory relief:** By way of its conduct described in this complaint, Apple has acted on grounds that apply generally to the proposed classes. Accordingly, final injunctive relief or corresponding declaratory relief is appropriate respecting the classes as a whole.

140.     **Predominance and superiority:** This proposed class action is appropriate for certification. Class proceedings on these facts and this law are superior to all other available methods for the fair and efficient adjudication of this controversy, given that joinder of all members is impracticable. Even if members of the proposed classes could sustain individual litigation, that course would not be preferable to a class action because individual litigation would

increase the delay and expense to the parties due to the complex factual and legal controversies present in this matter. Here, the class action device will present far fewer management difficulties, and it will provide the benefit of a single adjudication, economies of scale, and comprehensive supervision by this Court. Further, uniformity of decisions will be ensured.

#### **IV. CAUSES OF ACTION**

##### **APPLE CAUSES OF ACTION**

###### **COUNT I (Sherman Act)**

###### **INTERSTATE RESTRICTION OF US SMARTPHONE USERBASE ACCESS, NOTARY STAMP**

141. Plaintiffs restate, re-allege, and incorporate by reference each of the allegations set forth in the rest of prior sections of this Complaint, up to and through the Putative Class Definitions, as if fully set forth herein.

142. Apple's conduct violates Section 1 of the Sherman Act, which prohibits “[e]very contract, combination in the form of trust or otherwise, or conspiracy, in restraint of trade or commerce among the several States, or with foreign nations.” 15 U.S.C. § 1.

143. Apple holds monopoly power in the market for developer access to the smartphone userbase. Apple controls most access to these users, given their strong preference for local apps (versus websites) and limited functionality of

browser SDKs. In other words, a developer of an app that requires SDK cannot access the iPhone userbase, without Apple's permission.

144. A developer cannot reasonably substitute another userbase, such as Android. They would forego 80% of profits, or 65% of users. For a public health app such as Coronavirus Reporter, this would defeat the functionality of the app by skewing statistics and omitting over half the population. For CALID and WebCaller, it would curtail a critical mass needed to make the app successful.

145. Apple charges developers \$99 each and every year to purportedly be able to access this userbase, in the form of notary stamps or direct userbase access rights, which are only selectively given at Apple's "absolute discretion" in the DPLA contract of adhesion.

146. Each year Apple charges this fee represents an independent transaction, and a new and distinct violation of the Sherman Act. Plaintiff CALID Inc. most recently paid this fee in October 2023. Plaintiff Coronavirus Reporter Corporation has not paid this fee, and has not signed the DPLA, and believes doing so would violate its rights under Sherman Act.

147. Apple unlawfully maintains its monopoly powers over userbase access through its software algorithms and hardware constraints that implement a notarization requirement.

148. Operating system notary stamps is Apple's algorithmic invention to create an artificial monopoly, not unlike the "taxicab medallion" monopoly.

There was, and is, no need for such notary stamps in nearly every other computing platform in history. The iOS requirement of notary stamps is an algorithmic violation of the Sherman Act, and is done so purely with the intent to create a monopoly over userbase control.

149. These restraints mandate a developer pay \$99 to access the userbase, which is precisely why some two-million developers, many students, have had to join the Apple Developer program at an average cost to them of nearly one thousand dollars.

150. Apple severely restricts interstate commerce of app distribution and availability, by requiring a \$99 fee from developers to obtain notary stamp eligibility.

151. The artificial monopoly created by notarization stamps and the subsequent \$99 userbase access fees results in damages to nearly twenty million proposed class members of approximately one thousand dollars each. Under treble damages, Sherman Act mandates recovery of \$8 billion USD to these class members. When the stamps aren't issued, further damages accrue from lost app revenues. Even if Apple blocked just one "unicorn" app like Robinhood (\$35 billion valuation) in a decade, Sherman Act provides \$105 billion in treble damages. Evidently Apple rejects a valid app much more than once a decade, leading to staggering losses to our economy. In China, "open" app stores are ten times the size of Apple's App Store in China. This is irrefutable evidence of this point on "lost unicorns."

152. Plaintiff CALID has paid nearly a decade in these fees, and therefore haas standing to represent the proposed class members. They are first-to-file these claims.

153. Much damage is done to the overall competition within the institutional app markets, as a result of Apple's anticompetitive practices in userbase access, notarization and onboarding. But the damages extend beyond those markets, into the overall US economy, and even public health response, in the case of Coronavirus Reporter. Any Plaintiff or class member with a rejected app was harmed by the aforementioned practices. The vast "network effect" of the nations' trillion-dollar investment in smartphone networks is severely curtailed, diminished, bottleneck, and harmed by Apple's algorithmic interstate trade restrictions.

**COUNT II**  
**ASPEN SKIING CO. V. ASPEN HIGHLANDS SKIING CORP.**  
**EXCLUSIONARY CONDUCT AND**  
**MCI DENIAL OF ESSENTIAL FACILITIES**

154. Plaintiffs restate, re-allege, and incorporate by reference each of the allegations set forth in the prior sections of this Complaint as if fully set forth herein.

155. *Aspen* unequivocally broadens the examination of monopolistic behavior beyond the boundaries of market definition into the realm of exclusionary conduct. The Supreme Court has provided vital precedent, recognizing that a monopolist's refusal to deal with competitors, absent a credible efficiency

rationale, can constitute a standalone concern under the purview of antitrust enforcement. The operative conduct under scrutiny is exclusion of rivals, not the defendant's power within a strictly defined market.

156. The record demonstrates that *Coronavirus Reporter* was a competing app to Apple's own Covid-19 SDK applications. Plaintiffs present allegations that mirror the factual antecedents of *Aspen Skiing*—articulating a pattern of exclusionary actions directed against competitors by Apple which bore no relation to efficiency or consumer benefit, instead stifling innovation, competition, and market accessibility. This conduct, tantamount to the exclusionary practices in *Aspen Skiing*, where the Supreme Court found monopoly leveraging absent a detailed market analysis, calls for substance over strict formality in identifying antitrust violations.

157. To save lives, *Coronavirus Reporter* needed to utilize GPS and other systems not readily available on websites. Apple excluded a rival in the free-app space and even potentially in a relevant market for COVID tracking apps, should a jury determine such a market exists.

158. With the weight of the Supreme Court's guidance in *Aspen Skiing*, Plaintiffs respectfully submit that this underscores the necessity for a permanent injunction to redress Sherman Act violations.

159. Most essential facility cases considered by district courts during the past decade rely on the four prong test enunciated in *MCI Communications Corp. v. American Tel. & Tel. Co.*, 708 F.2d 1081 (7th Cir.), cert. denied, 464 U.S. 891

(1983), a case challenging AT&T's use of local telephone networks to thwart competition in the long distance telephone service market. There, the court held that "to establish liability under the essential facilities doctrine [a plaintiff must show]: (1) control of the essential facility by a monopolist; (2) a competitor's inability practically or reasonably to duplicate the essential facility; (3) the denial of the use of the facility to a competitor; and (4) the feasibility of providing the facility." Id. at 1132-33.

160. Apple's conduct completes all four elements of the MCI test.

161. Apple competes with developers in the app markets, which are downstream from the smartphone enhanced device market, where it is a monopolist. It is also a monopolist/monopsonist in the institutional app markets.

162. Apple controls an essential facility necessary to compete in these markets.

163. Apple controls access to the smartphone userbase and institutional app markets through notarization and digital signature requirements, and restriction of onboarding software. A developer is unable to compete in the marketplace of apps, without these notary stamps and application loaders. Apple restricts the entire iOS App marketplace (both sides, institutional and retail) by excluding developers from these two technologies. Notary stamps, application loaders, and contractual iOS userbase access are therefore essential facilities under Apple's control.

164. Apple engages in exclusionary behavior that denies essential facilities to Plaintiffs and other app developers. Apple routinely denies notary stamps to developers, as it did with Plaintiffs Coronavirus Reporter, Primary Productions, and Caller-ID. Likewise, it denies application loaders to all except enterprise users, with the exception of short leases on a per-app basis. Contractually, it denies access to the iOS userbase through restrictive DPLA App Store policies.

165. Because Apple has its own apps in the competing in the institutional app marketplaces, by definition Apple excludes competitors. Apple does so by leveraging its control over the iOS App Store and operating system.

166. App developers are unable to reasonably or practically duplicate the entire infrastructure for the iOS userbase, notary stamps, or application loaders. Duplicating the entire iPhone userbase is about as feasible as recreating a mountain — in reference to binding caselaw from *Aspen Skiing Co* (472 U.S. 585, 1985). Likewise, notary stamps cannot be reproduced because they contain encryption codes. Third-party application loaders cannot be added to the iOS it would require rewriting the entire iOS, which is not even technically possible due to hardware controls implemented by Apple. Apple's exclusionary practices, blocking programmers from accessing a network of hundreds of millions of computers, is truly unprecedented.

167. In fact, providing tools to access a computing platform userbase is exactly what Apple has done for forty years with the Mac product ecosystem, a respected and successful computing platform.

168. Apple's denial of access to iOS users and networks has no legitimate business purpose, and serves only to assist Apple in maintaining its unlawful monopoly position in the increasingly critically important app market.

169. Apple's conduct affects a substantial volume of interstate as well as foreign commerce. Apple's conduct has substantial anti-competitive effects, including increased prices and costs, reduced innovation and quality of service, and lowered output.

170. As an app developer, Plaintiffs have been harmed by Apple's anti-competitive conduct in a manner that the antitrust laws were intended to prevent. Plaintiffs have suffered and continue to suffer harm and irreparable injury, and such harm and injury will not abate until an injunction ending Apple's anti-competitive conduct issues.

171. Apple's exclusionary behavior blocked an entire class of COVID startups from contributing to a public health emergency. Lives were likely lost, and Apple's behavior must now be dealt with by the Court to prevent further damages.

172. To prevent these ongoing harms, the Court should enjoin the anti-competitive conduct complained of herein.

**COUNT III**  
**SHERMAN ACT §1**

## **DPLA AS UNREASONABLE RESTRAINT OF TRADE**

173. Plaintiffs repeat and re-allege each and every allegation contained herein as if fully stated under this count.

174. Apple's conduct violates Section 1 of the Sherman Act, which prohibits “[e]very contract, combination in the form of trust or otherwise, or conspiracy, in restraint of trade of commerce among the several States, or with foreign nations.” 15 U.S.C. § 1.

175. The relevant market is the U.S. National Institutional App marketplace. Alternatively, the relevant market is the U.S. iOS Device App Institutional marketplace.

176. The Apple Developer Program License Agreement and the end-user EULA terms of the App Store are contracts that unreasonably restrain competition in the Institutional App Marketplaces. This has an effect of limiting competition in the critically important US institutional app marketplace, and likewise consumer app choice and quality in the retail facing side of the market. Alternatively, the DPLA restricts competition in the single-product iOS Institutional App Marketplace (the developer-facing monopsony).

177. Apple has induced and coerced developers to sign and be bound by their contracts of adhesion. The contracts waive Plaintiffs' rights to access the iOS userbase, and allow Apple “carte blanche” to restrict or deny any app, favor competitors and cronies, and/or overcharge, or underpay. Those who do not sign the DPLA are completely blocked from accessing the institutional

marketplaces, because they cannot list on the App Store nor can they obtain notary stamps or application loading leases.

178. Apple's conduct and unlawful contractual restraints harm a market that forms a substantial part of the domestic economy, the smartphone enhanced internet device app market. Apple holds approximately 60-80% of total commerce in that market, or 100% of the iOS app market alternatively.

179. Apple's conduct under purported authority of the DPLA, i.e. determining which applications will or will not be published on the App Store, has substantial anti-competitive effects, including here an outright bar disallowing any startup from assisting in the pandemic relief, via an app. Plaintiffs Coronavirus Reporter, and CALID, and many other startups wishing to help were barred from doing so, because of Apple's illegal contracts.

180. Competition amongst COVID startups may have indeed saved lives, better informed the public, and provided other intangible benefits.

181. The restraint in this case is even more severe than it may appear on face value because COVID applications like Plaintiffs' are only useful if they achieve a critical mass of users. Apple's disallowment prevented Coronavirus Reporter and CALID from realizing their full potential on any available device marketplace. In other words, non-Apple device users would have a product with reduced functionality, because of Apple's anticompetitive behavior.

182. Apple's conduct caused Plaintiffs substantial injury. Non-startup, permitted apps from recognized institutions that were allowed in March 2020

obtained millions of downloads and a top rank in the App Store, demonstrating the strong demand for COVID information applications at that time.

183. Evidence is irrefutable that Apple green-lit an almost identical app, Zoe created by Guy St Thomas and Kings College London, and other later contributors.

184. Ironically, after all of these years Apple forgot it was founded in the garage of two independent inventors, the legendary American entrepreneurs Steve Jobs and Steve Wozniak. There was no good reason, decades later, for Apple to mandate that only institutions may contribute to the COVID emergency. This defies Apple's own means of creation. The public can choose which app authors they wish to use, and it is more than evident that Plaintiff's app, at a time when no other COVID apps existed, would have been downloaded by millions. Here, Apple unlawfully put its thumb on the scales, destroying any chance that Coronavirus Reporter and its fellow startups such as CALID had to participate in the open and free information exchange afforded by the internet. To prevent these harms, this Honorable Court shall permanently enjoin the aforementioned anti-competitive behavior induced by the DPLA.

**COUNT IV**  
**SHERMAN ACT §2**  
**RANKING SUPPRESSION AS RESTRAINT OF INTERSTATE**  
**TRADE**

185. Plaintiffs repeat and re-allege each and every allegation contained herein as if fully stated under this count.

186. Apple's conduct violates Section 2 of the Sherman Act, which prohibits "monopolization of any part of the trade or commerce among the several States, or with foreign nations. 15 U.S.C. Section 2

187. The relevant market is the U.S. National Institutional App marketplace. Alternatively, the relevant market is the U.S. iOS Device App Institutional marketplace. Apple holds monopoly power in these markets for smartphone apps.

188. Apple unlawfully restricts trade in the aforementioned markets, through app ranking suppression. When an app isn't listed in a critical directory, such as the App Store rankings, or is ranked below where it should fairly be, fewer customers can discover the app. This results in customers defaulting to bundled apps, i.e. Apple's preinstalled apps, or to Apple's (and cronies) other apps given self-preferential treatment in the App Store rankings. By leveraging its monopoly in the device market, and requiring customers to use the App Store rankings, Apple is able to restrain trade downstream, in the institutional app market.

189. By not listing an App correctly on the app store, i.e. suppressing it, the consumers simply cannot find developers through their preferred means of search (App Store). This would be equivalent to a Yellow Pages not listing competitors. When a business isn't listed under the correct keywords, or any keywords, on the primary directory of all iOS apps, interstate commerce is

restricted. Transparent information enables efficient commerce; the App Store is the opposite, and results in substantial quantities of lost app installs.

190. Apple's conduct in self-preferential App Store rankings restricts interstate trade in these critical markets and must be enjoined by this Honorable Court.

**COUNT V (Sherman Act § 1)**  
**TYING THE APP STORE, NOTARY STAMPS, AND SOFTWARE**  
**ONBOARDING TO THE IOS DEVICE MARKET**

191. Plaintiffs restates, re-alleges, and incorporates by reference each of the allegations set forth in the prior sections of this Complaint as if fully set forth herein.

192. Apple's conduct violates Section 1 of the Sherman Act, which prohibits “[e]very contract, combination in the form of trust or otherwise, or conspiracy, in restraint of trade or commerce among the several States, or with foreign nations”.<sup>15</sup> U.S.C. § 1.

193. Through its End User Agreement with iPhone users, hardware constraints, and its kernel notarization requirements, Apple has unlawfully created a tie between the iPhone smartphone to the App Store distribution service and/or digital Notary Stamps.

194. Apple has sufficient economic power in the tying market, the US Smartphone Device market, because it holds 65% of this market. Moreover, the iPhone Device user often is locked in to their device, or has substantial barriers to exit. As such, the user has no choice but to accept the App Store

offerings (Apple's curated apps, favoring their own competing products) and Notary Stamp requirement which are mandated by the EULA.

195. Apple is able to unlawfully condition access to the iPhone device to the use of a second product—App Store app distribution service. Through its End User License Agreement and unlawful policies, Apple expressly conditions the use of its devices on its “walled garden” app store marketplace – which is subject to severe bottleneck constraints on the developer work-product availability and selection. This amounts to a *per se* unlawful tying arrangement, pernicious conduct under *Northern Pacific*, and a dangerously inefficient one that denies users the benefit of the network they invested in.

196. The tying product, Apple's iPhone smartphone device, is distinct from the tied product, Apple's App Store. App developers such as Plaintiffs have apps, and effectively their own “app store” that would be trivial to launch on their website, but for Apple's EULA and notarization requirements. In other words, end users are coerced into using the App Store, and everybody (including developers) pay the consequences. Apple's unlawful tying arrangement thus ties separate products that are in separate markets and coerces Plaintiffs and third-party end users to rely on both of Apple's products. The tying to a device (iPhone) is not immune to *per se* rules subsequent to *Microsoft* because the tying product is not a software platform, it is a hardware device. In the words of Tim Cook, “Apple sells devices.”

197. Secondly, Apple is able to unlawfully condition access to iPhone device features and network effects on the end-users use of a second product—notary stamps. Through its algorithmic control of the iOS kernel and hardware constraints, the end user effectively is contractually (algorithmically) bound to use apps with Notary Stamps. Developers are unable to purchase them, to the tune of 40,000 denials per week. This amounts to a *per se* unlawful tying arrangement, and a dangerously inefficient one that denies users the choice and selection of diverse apps. Neither the iPhone nor the notary stamp qualify as “software platforms” under *Microsoft*.

198. The tying product, Apple’s iPhone device, is distinct from the tied product, notary stamps, because such a “permission ticket” to launch an app is separate from a smartphone, even though most other platforms don’t require it. Apple’s unlawful tying arrangement thus ties two separate products that are in separate markets and coerces Plaintiffs and third-party end users to rely on both of Apple’s products. Apple created an artificial demand for notary stamps using their kernel algorithms and EULA.

199. Apple’s conduct has foreclosed, and continues to foreclose, competition in the US Smartphone App Market affecting a staggering volume of commerce in these markets. By way of reference, the Chinese app markets are nearly four times the size of any US market, which is in large part due to the increased competition in that country. Likewise, competition is severely foreclosed in the notary stamp and onboarding software markets.

200. Apple has thus engaged in a *per se* illegal tying arrangement and the Court does not need to engage in a detailed assessment of the anti-competitive effects of Apple's conduct or its purported justifications.

201. In the alternative only, even if Apple's conduct does not constitute a *per se* illegal tie, an analysis of Apple's tying arrangement would demonstrate that this arrangement violates the rule of reason and is illegal by coercing end-users into using its App Store and notary stamps.

202. Apple's conduct harms those Plaintiffs and class members which, as a direct result of Apple's anti-competitive conduct, are receiving infra-competitive fees on institutional app sales to monopsonist Apple, and cannot sell their work-product to consumers directly, as they lack the ability to onboard it, and even if they could, it would not be notarized.

203. The U.S. Supreme Court has held that "the answer to the question whether one or two products are involved turns not on the functional relation between them, but rather on the character of demand for the two items." Thus, the most important factor in determining whether two distinct products are being tied together is whether customers want to purchase the products separately. If customers are not interested in purchasing the products separately, there is little risk the tie could foreclose any separate sales of the products. Here, all tied products meet the SCOTUS requirement for consumer interest. Clearly, consumers are interested in purchasing apps separately from smartphones. Consumers also want permission to run these apps (notary

stamps), and fought for “jailbreaking rights” to the US Copyright Office, which was granted. Lastly, there is little question of demand for convenient, reasonably priced “onboarding software.” The Mac “Finder” revolutionized such an easy-to-use launching GUI, and arguably, is the reason Apple exists today.

204. A party seeking to defend such a *per se* tying arrangement on the basis of competitive justifications bears a heavy burden of proof; the defense is difficult to establish and has been successful only under limited circumstances. For these reasons, the Court should approve a Preliminary Injunction ending notarization requirements, filed simultaneously with this Complaint.

205. Plaintiffs have been harmed by Apple’s anti-competitive conduct in a manner that the antitrust laws were intended to prevent. Plaintiffs suffer harm and irreparable injury, and such harm and injury will not abate until an injunction ending Apple’s anti-competitive conduct issues. To prevent these ongoing harms, the Court should permanently enjoin the anti- competitive conduct complained of herein.

**COUNT VI (SHERMAN ACT 15 U.S.C § 2)**  
**VIOLATION OF SHERMAN ACT § 2 – \$99 FEE ILLEGALITY**

206. Plaintiffs repeat and re-allege each and every allegation of the preceding sections as if fully stated under this count.

207. Apple’s conduct violates Section 2 of the Sherman Act, which prohibits “monopolization of any part of the trade or commerce among the several States, or with foreign nations. 15 U.S.C. Section 2

208. The relevant market is the U.S. National Institutional App marketplace.

Alternatively, the relevant market is the U.S. iOS Device App Institutional marketplace. These markets, collectively the “US Institutional App Marketplaces” are downstream of the smartphone enhanced internet device, and iOS device markets, respectively. In simple terms, there is a market for apps, which Apple itself competes in with their proprietary apps.

209. Apple holds monopoly power in the market for smartphone enhanced commerce and information flow (devices and apps) transacted via the national internet backbone. That is, Apple has a monopoly on the US iOS device market, smartphone market, smartphone app market, and iOS app market.

210. Apple unlawfully maintains its monopoly powers in the aforementioned markets, and app submarkets, by issuing an illegal demand of money from 20 million aspiring developers. Apple extracts \$99 each year from any aspiring developer – many being college students or recent, indebted graduates – if they wish to access the iOS userbase or get their software notarized to run on an iOS device.

211. The Congressional Subcommittee refers to this as an illegal tax that may have amounted to nearly \$20 billion over the last ten years. The Subcommittee states that the \$99 fee is nowhere near Apple’s actual cost to notarize and run the software platforms.

212. Indeed, Epic’s findings of facts, incorporated herein, devoted much time to elucidate how Apple, under Steve Job’s promise to charge developers just

enough to cover Apple's costs, evolved into one of the largest illegal taxes in history. Epic's discovery of this matter is particularly useful to protect the rights of our class members (Epic did not file a class action), and Plaintiffs' counsel is grateful for the work Epic and Cravath conducted to uncover this illegal tax.

213. By way of comparison, Google charges \$25 to developers to join their program, and this is optional. Any developer may write an Android app and sell it to a consumer for sideloading, without Google's permission. It is mystifying that the US Government has actively pursued Sherman Act claims against the Google Play Store, but won't even answer (see below claim) complaints to the FTC concerning Apple's far more egregious behavior. To pursue antitrust actions against Android, when it permits application loading, does not require notary stamps, and charges one-quarter Apple's developer fees is a double-standard.

214. Not only are Apple's fees an illegal tax of nearly \$1000 to each of these developers over their career, but they heavily impede interstate commerce. A developer who does not pay this tax, perhaps because they cannot afford it, will not produce apps. App output is restricted unless one assumes that 100% of developers can afford to pay this tax without consequence to their productivity. Clearly such an assumption is not reasonable. Hence, interstate commerce of valuable digital assets – iOS apps— is severely restricted by this illegal demand.

215. The illegal demand to 20 million developers – nearly every computer programmer on the planet – is used to fund the growth of Apple’s monopoly, and must be enjoined by this Court, as mandated by the Sherman Act. The intent and wishes of Steve Jobs must be upheld.

### **PERMANENT INJUNCTION**

#### **RESTRAINING SHERMAN ACT VIOLATIONS**

216. The Court shall enter a permanent injunction, enjoining and restraining Defendant Apple from further anticompetitive restraints on the relevant markets, as regulated by the Sherman Act. Specifically, the permanent injunction shall enjoin Apple from:

217. Executing code in the iOS kernel that, when a user requests to launch an app, checks for the presence of Apple’s digital signature, and disables launch if such signature is nonexistent. (“Eliminate Notary Stamp Requirement”)

218. Executing code in the iOS kernel that prevents a user from downloading, transferring, or otherwise receiving and installing an application from sources other than the App Store, including the Safari browser, Airdrop/Bluetooth, and other routine file transfer mechanisms. (“Eliminate Finder/Application Loader disabling”)

219. Blocking, rejecting, or banning any App Store third-party developer app submission of legal content for censorship reasons. (“Eliminate App Store App

Review self-preferential behavior and censorship”). By way of exception, Apple may prohibit any app if:

- i) the submitted app clearly executes instructions or contains content that violates local, state, national, and/or global laws and treatises. Due Process must exist at the governmental level to determine such violation; Apple may not employ editorial censorship, political fact checking, and other such purported law enforcements devoid of Due Process.
- ii) the submitted app executes instructions that could reasonably likely cause device malfunction, incomplete execution, or device failure.

220. Plaintiffs have paid the \$99 fee as recently as October 2023. Each annual subscription fee constitutes an independent transaction and hence independently subject to Sherman Act redress and statutes of limitations, separate and apart from the date of any app censorship and/or disallowance.

221. Taxing developers a mandatory \$99 annual subscription fee to access App Store submission protocols. Developers may voluntarily join Apple’s Developer Program, as they did for decades with the Mac. Developers may also join a limited developer program, at a market-reasonable rate, to obtain notary stamps certifying their app to be free of malware and certifying an age appropriateness rating. Apple may “enable by default” an iOS control requiring notary stamps whose purpose and function is limited to malware scanning and

parental control age certification, which is exactly what the MacOS does today.

This default behavior may be switched off by any user who possesses legitimate reasons to run non-notarized software.

WHEREFORE, The Plaintiffs and class members respectfully request that this Honorable Court:

A. Order treble damages compensating the Class Members, estimated in the billions<sup>2</sup> USD, and to Lead Plaintiffs:

- a. Plaintiff Coronavirus Reporter Corporation, the first-mover in the COVID informatics sector, suffered losses of no less than \$600 million in goodwill, sponsorships, costs and charges for its version 1.0 through 3.0 apps.
- b. Plaintiff CALID Inc., an early 2016 mover in the telehealth and teleconferencing sectors, suffered platform losses in brand goodwill, revenues, operating costs and charges. The “WebCaller” application it submitted on behalf of a developer was completely Sherlocked by Apple to create FaceTime 15, suffering losses greater than \$12 billion USD.

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<sup>2</sup> By creating an inefficient bottleneck on the entire institutional app market, Apple put itself in a precarious liability position for lost value creation. Take for example the Robinhood IPO, which carried a \$35 billion valuation. If Apple blocked just one single app from succeeding at this level, it would be liable for \$105 billion (3x punitive). Our estimate assumes 500 apps were suppressed or rejected, with an average valuation of \$60million. This equates to \$90 billion in damages, and approaches \$200 billion when ten years of \$99 developer fees are factored in. Put differently, \$200 billion is approximately ten percent of Apple’s market valuation, and it seems reasonable that the aforementioned anti-competitive behaviors would have accrued at least a 10% accrual to Apple’s worth. Apple’s restrictive practices create negative externalities: thousands of rejected apps represent substantial lost value creation to the US economy.

- B. Issue a permanent injunction under the Sherman Act restraining Defendant Apple from denying developers access to the US Smartphone Market; from requiring notary stamps to launch an iPhone application, and from charging \$99 annual developer fees to two million iPhone developers, and any and all other anticompetitive behavior the jury finds.
- C. Certify this case as a developer class action lawsuit and that it certify the proposed federal law classes on a nationwide basis for all developers of apps that were censored, disallowed or subject to ranking suppression, or subject to excessive \$99 annual subscription fees between today's filing date in 2024 and four years prior.
- D. Grant any further relief as may be fair and just.

Respectfully submitted, this 5<sup>th</sup> day of March 2024.

/s/ Keith Mathews  
Keith Mathews  
Attorney for Plaintiffs  
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### CERTIFICATE OF SERVICE

I, Melissa R. Theriault, do declare as follows:

I certify that a copy of the foregoing *Complaint for Damages and Injunctive Relief* shall be served in accordance with Wyoming and United States applicable law.

Executed on this 5th<sup>th</sup> day of March 2024.



WOODHOUSE RODEN AMES & BRENNAN, LLC

# **INVESTIGATION OF COMPETITION IN DIGITAL MARKETS**

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## **MAJORITY STAFF REPORT AND RECOMMENDATIONS**

**SUBCOMMITTEE ON ANTITRUST,  
COMMERCIAL AND ADMINISTRATIVE LAW  
OF THE COMMITTEE ON THE JUDICIARY**

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**Jerrold Nadler, Chairman, Committee on the Judiciary**

**David N. Cicilline, Chairman, Subcommittee on  
Antitrust, Commercial and Administrative Law**



**UNITED STATES  
2020**

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### iii. Self-Preferencing

According to market participants, once a product—based on open source or otherwise—is available in the AWS Management Console, it becomes an easier choice for existing AWS customers relative to purchasing a managed service from a third-party vendor or self-managing open-source software. In an interview with Subcommittee staff, one startup said they purchased software services through the AWS Management Console as opposed to identical or nearly identical software from a third-party vendor because they were a small company and “instead of us managing everything, it was hit a button . . . they are all in one, it was easier.”<sup>2074</sup> As with all cloud services offered through the AWS Management Console, customers benefit from a single sign-on with billing information already in place.<sup>2075</sup>

Market participants also note that Amazon makes certain functionality available to its first-party products that it doesn’t make available to the companies managing the original version of the open-source software.<sup>2076</sup> For example, AWS services can run inside Amazon’s Virtual Private Could (Amazon VPC) offering, which allows users to provision an “isolated section of the AWS Cloud,” but third-party services cannot do so.<sup>2077</sup>

While Amazon failed to provide the Subcommittee with financial data identifying what AWS makes in revenue from individual cloud offerings, many marketplace participants believe that AWS makes more from managed versions of open-source software than the third-party vendors and managers of the software. In 2019, *The New York Times* reported that the Chief Executive of MariaDB, an open-source relational database company, estimated that “Amazon made five time more revenue from running MariaDB software than his company generated from all of its businesses.”<sup>2078</sup> Market participants suggest this multiple of difference in income is likely for other AWS products based on open-source projects.<sup>2079</sup>

## D. Apple

### 1. Overview

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<sup>2074</sup> Interview with Source 126 (June 29, 2020).

<sup>2075</sup> Interview with Source 146 (May 28, 2020).

<sup>2076</sup> Interview with Source 152 (Sept. 24, 2020).

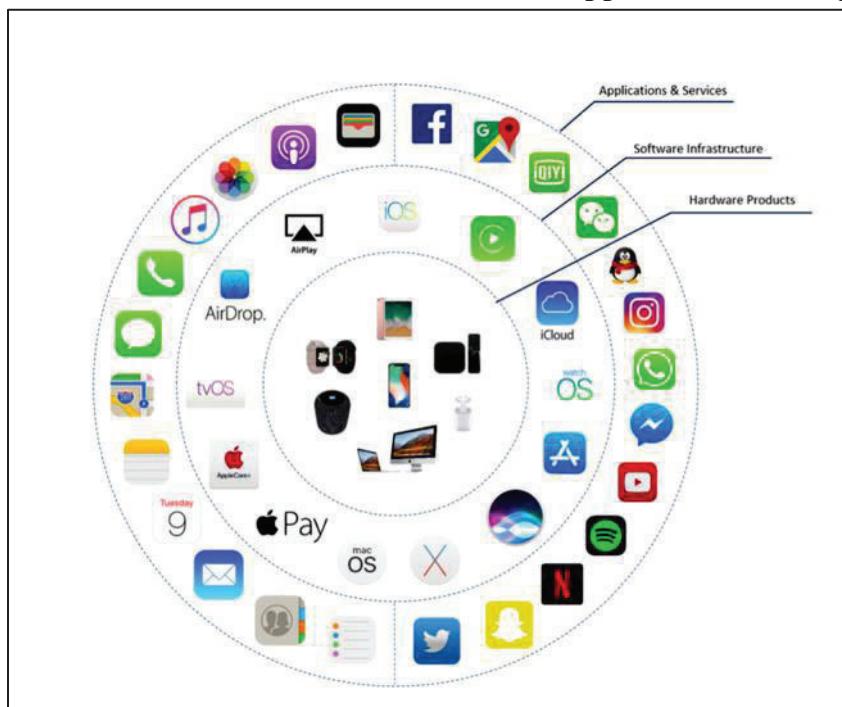
<sup>2077</sup> *Amazon Virtual Private Cloud*, AMAZON WEB SERVICES, <https://aws.amazon.com/vpc/> (last visited Sept. 30, 2020).

<sup>2078</sup> Daisuke Wakabayashi, *Prime Leverage, How Amazon Wields Power in the Technology World*, N.Y. TIMES (Dec. 16, 2019), <https://www.nytimes.com/2019/12/15/technology/amazon-aws-cloud-competition.html>.

<sup>2079</sup> Interview with Source 146 (May 28, 2020).

Apple was incorporated in 1977, and is headquartered in Cupertino, California.<sup>2080</sup> Apple was an early pioneer in designing and marketing mass-produced personal computers.<sup>2081</sup> Today, the company “designs, manufacturers, and markets smartphones, personal computers, tablets, wearables, and accessories, and sells a variety of related services.”<sup>2082</sup> Apple’s hardware products include the iPhone, iPad, Mac, Apple TV, and AirPods; its Services business segment includes the App Store, iCloud, AppleCare, Apple Arcade, Apple Music, Apple TV+, and other services and software applications.<sup>2083</sup> Apple tightly integrates its services and software applications with its products to ensure a seamless experience for consumers.<sup>2084</sup>

### Apple’s Ecosystem: Hardware, Software Infrastructure, Apple & Third-Party Apps<sup>2085</sup>




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<sup>2080</sup> Apple Inc., Annual Report (Form 10-K) 1 (Sept. 28, 2019), [https://s2.q4cdn.com/470004039/files/doc\\_financials/2019/ar\\_10-K-2019-\(As-Filed\).pdf](https://s2.q4cdn.com/470004039/files/doc_financials/2019/ar_10-K-2019-(As-Filed).pdf).

<sup>2081</sup> See Angelique Richardson & Ellen Terrell, *Apple Computer, Inc.*, LIB. OF CONGRESS (Apr. 2008), <https://www.loc.gov/rr/business/businesshistory/April/apple.html>.

<sup>2082</sup> Apple Inc., Annual Report (Form 10-K) 1 (Sept. 28, 2019), [https://s2.q4cdn.com/470004039/files/doc\\_financials/2019/ar\\_10-K-2019-\(As-Filed\).pdf](https://s2.q4cdn.com/470004039/files/doc_financials/2019/ar_10-K-2019-(As-Filed).pdf).

<sup>2083</sup> *Id.* at 1–2.

<sup>2084</sup> See Apple, *Apple: Distinctive Products with a Seamless, Integrated User Experience* 1 (July 13, 2020) (on file with Comm.)

<sup>2085</sup> *Are domestic investors missing out?*, SWELL, (June 22, 2018), <https://swellasset.com.au/2018/06/domestic-investors-missing/>.

Apple reports financial information for two business categories: Products and Services.<sup>2086</sup> For fiscal year 2019, Apple reported total revenue of approximately \$260 billion, down 2% from 2018, but up nearly 13.5% from 2017.<sup>2087</sup> Apple's total margins were 37.8%, with profits of \$98.3 billion.<sup>2088</sup> As of September 2020, Apple is the most valuable public company in the world, and in August 2020 became the first publicly traded U.S. firm to be valued at \$2 trillion.<sup>2089</sup> Apple's stock rose by 60% in the first 8 months of 2020.<sup>2090</sup>

Apple is the leading smartphone vendor in the U.S., accounting for approximately 45% of the domestic market,<sup>2091</sup> with more than 100 million iPhone users worldwide.<sup>2092</sup> Apple's iOS is also one of two dominant mobile operating systems—the other operating system, Android, is discussed elsewhere in this Report. iOS runs on more than half of U.S. smartphones and tablets.<sup>2093</sup> Globally, Apple accounts for less than 20% of the smartphone market, and roughly 25% of smartphones and tablets run on iOS worldwide.<sup>2094</sup> In 2018, Apple sold its 2 billionth iOS device, and is projected to sell its 2 billionth iPhone by 2021.<sup>2095</sup>

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<sup>2086</sup> Apple Inc., Annual Report (Form 10-K) 19 (Sept. 28, 2019), [https://s2.q4cdn.com/470004039/files/doc\\_financials/2019/ar\\_10-K-2019-\(As-Filed\).pdf](https://s2.q4cdn.com/470004039/files/doc_financials/2019/ar_10-K-2019-(As-Filed).pdf).

<sup>2087</sup> *Id.* at 17–19; *see also* Apple's 1 Crazy Number Key to \$800 Billion in Stock Growth, FORBES (July 13, 2020), <https://www.forbes.com/sites/greatspeculations/2020/07/13/how-did-apple-add-800-billion-in-value-over-3-years/#5b9250df20f8>.

<sup>2088</sup> *Id.* at 21, 29.

<sup>2089</sup> Jessica Bursztynsky, *Apple becomes first U.S. company to reach a \$2 trillion market cap*, CNBC (Aug. 19, 2020), <https://www.cnbc.com/2020/08/19/apple-reaches-2-trillion-market-cap.html>.

<sup>2090</sup> Kifi Leswing, *Apple's \$2 trillion value is proof that Tim Cook's services plan worked*, CNBC (Aug. 19, 2020), <https://www.cnbc.com/2020/08/19/apples-2-trillion-value-proof-that-tim-cooks-services-plan-worked.html>.

<sup>2091</sup> See S. O'Dea, *Manufacturers' market share of smartphone sales in the United States from 2016 to 2020*, STATISTA (Sept. 3, 2020), <https://www.statista.com/statistics/620805/smartphone-sales-market-share-in-the-us-by-vendor/>; S. O'Dea, *Manufacturers' market share of smartphone subscribers in the United States from 2013 and 2019, by month\**, STATISTA (June 9, 2020), <https://www.statista.com/statistics/273697/market-share-held-by-the-leading-smartphone-manufacturers-oem-in-the-us/>; *US Smartphone Market Share: By Quarter*, COUNTERPOINT RESEARCH (Aug. 17, 2020), <https://www.counterpointresearch.com/us-market-smartphone-share/>; S. O'Dea, *Share of smartphone users that use an Apple iPhone in the United States from 2014 to 2021*, STATISTA (Sept. 10, 2020), <https://www.statista.com/statistics/236550/percentage-of-us-population-that-own-a-iphone-smartphone/>.

<sup>2092</sup> S. O'Dea, *Share of smartphone users that use an Apple iPhone in the United States from 2014 to 2021*, STATISTA (Sept. 10, 2020), <https://www.statista.com/statistics/236550/percentage-of-us-population-that-own-a-iphone-smartphone/>.

<sup>2093</sup> See S. O'Dea, *Subscriber share held by smartphone operating systems in the United States from 2012 to 2020*, STATISTA (Aug. 17, 2020), <https://www.statista.com/statistics/266572/market-share-held-by-smartphone-platforms-in-the-united-states/>; *Mobile Operating System Market Share United States of America Aug. 2019 – Aug. 2020*, GLOBALSTATS (on file with Comm).

<sup>2094</sup> See *Global Smartphone Market Share: By Quarter*, COUNTERPOINT RESEARCH, (Aug. 18, 2020), <https://www.counterpointresearch.com/global-smartphone-share/>; *Mobile Operating System Market Share Worldwide Aug. 2019 – Aug. 2020*, GLOBALSTATS (on file with Comm).

<sup>2095</sup> Malcolm Owen, *How Apple has hit 2 billion iOS devices sold, and when it will hit 2 billion iPhones*, APPLE INSIDER (Sept. 13, 2018), <https://appleinsider.com/articles/18/09/13/how-apple-has-hit-2-billion-ios-devices-sold-and-when-it-will-hit-2-billion-iphones>.

Apple also owns and operates the App Store for iOS devices. Launched in 2008, Apple highlights that the App Store allows app developers to reach consumers in 155 countries, and that more than 27 million app developers have published millions of apps in the App Store. Apple credits the App Store with creating 1.5 million jobs in the United States, and more than \$120 billion in worldwide revenue for app developers.<sup>2096</sup> According to Apple, the App Store ecosystem, including direct sales of apps, sales of goods and services inside of apps, and in-app advertising facilitated more than \$138 billion in economic activity in the U.S. last year.<sup>2097</sup>

In addition to the Subcommittee's investigation of Apple's market power and conduct, federal antitrust authorities are investigating it for potential violations of the U.S. antitrust laws. In June 2019, *The New York Times* and the *Wall Street Journal* reported that the Justice Department had opened investigations into potential violations of the antitrust laws by Apple.<sup>2098</sup> Apple is also under investigation by multiple international competition authorities for antitrust violations and anticompetitive practices,<sup>2099</sup> as well as private antitrust lawsuits in the U.S.<sup>2100</sup>

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<sup>2096</sup> See Letter from Kyle Andeer, Vice Pres. Legal & Chief Compliance Officer, Apple Inc., to Hon. Jerrold Nadler, Chairman, H. Comm. on the Judiciary, Hon. Doug Collins, Ranking Member, H. Comm. on the Judiciary, Hon. David N. Cicilline, Chairman, Subcomm. on Antitrust, Commercial and Admin. Law of the H. Comm. on the Judiciary, Hon. F. James Sensenbrenner, Ranking Member, Subcomm. on Antitrust, Commercial and Admin. Law of the H. Comm. on the Judiciary, 2 (Oct. 14, 2019) ( on file with Comm.); Letter from Kyle Andeer, Vice Pres., Corp. Law and Chief Compliance Officer, Apple Inc., to Hon. Jerrold Nader, Chairman, H. Comm. on the Judiciary, Hon. Jim Jordan, Ranking Member, H. Comm. on the Judiciary, Hon. David N. Cicilline, Chairman, Subcomm. on Antitrust, Commercial and Admin. Law of the H. Comm. on the Judiciary, Hon. F. James Sensenbrenner, Ranking Member, Subcomm. on Antitrust, Commercial and Admin. Law of the H. Comm. on the Judiciary, Hon. David N. Cicilline, Chairman, Subcomm. on Antitrust, Commercial and Admin. Law of the H. Comm. on the Judiciary, Hon. F. James Sensenbrenner, Ranking Member, Subcomm. on Antitrust, Commercial and Admin. Law of the H. Comm. on the Judiciary, 3 (Sept. 21, 2020) ( on file with Comm.).

<sup>2097</sup> Letter from Kyle Andeer, Vice Pres., Corp. Law and Chief Compliance Officer, Apple Inc., to Hon. Jerrold Nader, Chairman, H. Comm. on the Judiciary, Hon. Jim Jordan, Ranking Member, H. Comm. on the Judiciary, Hon. David N. Cicilline, Chairman, Subcomm. on Antitrust, Commercial and Admin. Law of the H. Comm. on the Judiciary, Hon. F. James Sensenbrenner, Ranking Member, Subcomm. on Antitrust, Commercial and Admin. Law of the H. Comm. on the Judiciary, 2 (Sept. 21, 2020) (on file with the Subcomm.) (citing JONATHAN BORCK ET AL., AG ANALYSIS GRP., HOW LARGE IS THE APPLE APP STORE ECOSYSTEM: A GLOBAL PERSPECTIVE FOR 2019, 4 (2020), <https://www.apple.com/newsroom/pdfs/app-store-study-2019.pdf>).

<sup>2098</sup> See Celia Kang et al., *Antitrust Troubles Snowball for Tech Giants as Lawmakers Join In*, N.Y. TIMES (June 3, 2019), <https://www.nytimes.com/2019/06/03/technology/facebook-ftc-antitrust.html>; Brent Kendall & John McKinnon, *Congress, Enforcement Agencies Target Tech*, WALL ST. J. (June 3, 2019), <https://www.wsj.com/articles/ftc-to-examine-how-facebook-s-practices-affect-digital-competition-11559576731>.

<sup>2099</sup> See e.g., Press Release, Eur. Comm'n, Antitrust: Commission opens investigation into Apple practices regarding Apple Pay (June 16, 2020), [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_20\\_1075](https://ec.europa.eu/commission/presscorner/detail/en/ip_20_1075); Foo Yun Chee, *Apple in Dutch Antitrust Spotlight for Allegedly Promoting Own Apps*, REUTERS (Apr. 11, 2019), <https://www.reuters.com/article/us-apple-antitrust-netherlands/apple-in-dutch-antitrust-spotlight-for-allegedly-promoting-own-apps-idUSKCN1RN215>; Italy Antitrust Opens Inquiry into Google, Apple, Dropbox on Cloud Computing, REUTERS (Sept. 7, 2020), <https://www.reuters.com/article/us-google-italy-antitrust/italy-antitrust-opens-inquiry-into-google-apple-dropbox-on-cloud-computing-idUSKBN25Y0YM>; Tim Hardwick, *Apple and Amazon Under Investigation By Italian Watchdog for Alleged Price Fixing*, APPLE INSIDER (July 22, 2020), <https://www.macrumors.com/2020/07/22/apple-amazon-italy-alleged-price-fixing/>.

<sup>2100</sup> See e.g., Nick Statt, *Epic Games is suing Apple*, THE VERGE (Aug. 13, 2020), <https://www.theverge.com/2020/8/13/21367963/epic-fortnite-legal-complaint-apple-ios-app-store-removal-injunctive-relief>; Reed Albergotti, *Apple suppressed competitors in its App Store – until it got caught, a lawsuit alleges*, WASH. POST (Dec. 20, 2019), <https://www.washingtonpost.com/technology/2019/12/20/apple-suppressed-competitors-its-app-store-until-it-got-caught-lawsuit-alleges/>; Bob Van Voris and Peter Blumberg, *Apple App Developers Jump on Silicon Valley*

Previously, the Justice Department and Attorneys General of 33 states sued Apple for orchestrating a conspiracy to fix prices in the eBooks market in 2012.<sup>2101</sup> Apple was found to have violated state and federal antitrust law and forced to pay \$450 million.<sup>2102</sup> In 2010, Apple settled an antitrust complaint with the Department of Justice that it conspired with several other technology companies to eliminate competition in hiring for employees,<sup>2103</sup> and it later settled a class action lawsuit by the affected employees through a \$415 million joint settlement agreement with other firms.<sup>2104</sup>

## 2. iOS and the App Store

### a. Market Power

Apple has significant and durable market power in the market for mobile operating systems and mobile app stores, both of which are highly concentrated.<sup>2105</sup> Apple's iOS mobile operating system is one of two dominant mobile operating systems, along with Google's Android, in the U.S. and globally.<sup>2106</sup> Apple installs iOS on all Apple mobile devices and does not license iOS to other mobile device manufacturers. More than half of mobile devices in the U.S. run on iOS or iPadOS, an iOS

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*Antitrust Bandwagon*, BLOOMBERG (June 4, 2019), <https://www.bloomberg.com/news/articles/2019-06-04/apple-inc-sued-by-app-developers-claiming-antitrust-violations>; David G. Savage and Suhana Hussain, *Supreme Court Rules Apple can face antitrust suits from iPhone owners over App Store sales*, L.A. TIMES (May 13, 2019), <https://www.latimes.com/politics/la-na-pol-supreme-court-apple-smart-phone-20190513-story.html>.

<sup>2101</sup> See Complaint, U.S. v. Apple Inc., No. 12-02826-UA (S.D.N.Y. 2012).

<sup>2102</sup> See U.S. v. Apple Inc., 952 F.Supp.2d 638 (S.D.N.Y. 2013), *aff'd* by U.S. v. Apple Inc., 791 F.3d 209 (2d Cir. 2015); Dawn Chmielewski, *Apple to Pay \$450 Million E-Book Settlement After Supreme Court Waves Off Case*, RECODE (Mar. 7, 2016), <https://www.vox.com/2016/3/7/11586748/apple-to-pay-450-million-e-book-settlement-after-supreme-court-waves>; see also August 27, 2013 H'r'g Tr. at 17:1-6, U.S. v. Apple Inc. , No. 12-cv-2826 (S.D.N.Y 2012) ("The record at trial demonstrated a blatant and aggressive disregard at Apple for the requirements of the law. Apple executives used their considerable skills to orchestrate a price-fixing scheme that significantly raised the prices of E-books. This conduct included Apple lawyers and its highest level executives."); see also Philip Elmer-Dewitt, *'I'd do it again,' says the man at the center of Apple's e-book case*, FORTUNE (Dec. 2, 2014), <https://fortune.com/2014/12/02/id-do-it-again-says-the-man-at-the-center-of-apples-e-book-case/>.

<sup>2103</sup> Press Release, U.S. Dep't of Justice, Department Requires Six High Tech Companies to Stop Entering into Anticompetitive Employee Solicitation Agreements (Sept. 24, 2010), <https://www.justice.gov/opa/pr/justice-department-requires-six-high-tech-companies-stop-entering-anticompetitive-employee>.

<sup>2104</sup> Dawn Chmielewski, *Silicon Valley Companies Agree to Pay \$415 Million to Settle "No Poaching" Suit*, RECODE (Jan. 15, 2015), <https://www.vox.com/2015/1/15/11557814/silicon-valley-companies-agree-to-pay-415-million-to-settle-no>.

<sup>2105</sup> See Stigler Report at 78 ("[T]he evidence thus far does suggest that current digital platforms face very little threat of entry. ... [T]he key players in this industry remained the same over the last two technology waves, staying dominant through the shift to mobile and the rise of AI. In the past, dominant businesses found it difficult to navigate innovation or disruption waves. By contrast, Facebook, Google, Amazon, Apple, and even Microsoft were able to ride these waves without significant impact on market share or profit margins. This indirect evidence corroborates the argument that these companies are facing few competitive threats.").

<sup>2106</sup> See *infra* Section IV.

derivation for tablets introduced in 2019.<sup>2107</sup> Apple’s market power is durable due to high switching costs, ecosystem lock-in, and brand loyalty. It is unlikely that there will be successful market entry to contest the dominance of iOS and Android.

As a result, Apple’s control over iOS provides it with gatekeeper power over software distribution on iOS devices. Consequently, it has a dominant position in the mobile app store market and monopoly power over distribution of software applications on iOS devices.<sup>2108</sup>

Apple’s App Store is the only method to distribute software applications on iOS devices.<sup>2109</sup> It does not permit alternative app stores to be installed on iOS devices, nor does it permit apps to be sideloaded. As discussed earlier in this Report, consumers have a strong preference for native apps to web apps,<sup>2110</sup> and Apple has acknowledged key differences between them. Developers have explained that Apple actively undermines the open web’s progress on iOS “to push developers toward building native apps on iOS rather than using web technologies.”<sup>2111</sup> As a result, Apple’s position as the sole app store on iOS devices is unassailable. Apple fully controls how software can be installed on iOS devices and CEO Tim Cook has explained that the company has no plan to permit an alternative app store.<sup>2112</sup> The former director of the app review team for the App Store observed that Apple is “not subject to any meaningful competitive constraint from alternative distribution channels.”<sup>2113</sup>

In response to these concerns, Apple has not produced any evidence that the App Store is not the sole means of distributing apps on iOS devices and that it does not exert monopoly power over app distribution. Apple says it does not create—nor is it aware of third-party data—that tracks market share in the app distribution market.<sup>2114</sup> Apple claims the App Store competes in a larger software distribution market that includes other mobile app stores, as well as the open internet, personal

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<sup>2107</sup> See S. O’Dea, *Subscriber share held by smartphone operating systems in the United States from 2012 to 2020*, STATISTA (Aug. 17, 2020), <https://www.statista.com/statistics/266572/market-share-held-by-smartphone-platforms-in-the-united-states/>; *Mobile Operating System Market Share United States of America Aug. 2019 – Aug. 2020*, GLOBALSTATS (on file with Comm); Jason Cipriani, *iPad turns 10: Why did it take a decade for Apple’s tablet to get its own operating system*, ZDNET (Jan. 24, 2020), <https://www.zdnet.com/article/a-decade-old-device-why-did-it-take-nine-years-for-the-ipad-to-get-its-own-operating-system/>.

<sup>2108</sup> See *infra* Section IV.

<sup>2109</sup> CEO Hearing Transcript at 50 (statement of Tim Cook, CEO, Apple Inc.) (responding to Representative Johnson’s question about whether Apple alone determines whether apps are admitted to the App Store Mr. Cook replied “If it’s a native app, yes, sir. If it’s a web app, no.”).

<sup>2110</sup> See *infra* Section IV.

<sup>2111</sup> Owen Williams, *Apple Is Trying to Kill Web Technology*, ONEZERO (Nov. 7, 2019), <https://onezero.medium.com/apple-is-trying-to-kill-web-technology-a274237c174d>.

<sup>2112</sup> CEO Hearing Transcript at 3 (response to Questions for the Record of Tim Cook, CEO, Apple Inc.).

<sup>2113</sup> Phillip Shoemaker, *Apple v. Everybody*, MEDIUM (Mar. 29, 2019), <https://medium.com/@phillipshoemaker/apple-v-everybody-5903039e3be>.

<sup>2114</sup> Production of Apple, to H. Comm. on the Judiciary, HJC-APPLE-000008 (Oct. 14, 2019) (on file with Comm.).

computers, gaming consoles, smart TVs, and online and brick-and-mortar retail stores.<sup>2115</sup> While consumers can access software and developers can distribute software through those platforms, none of those platforms permit consumers to access apps on an iOS device, or for developers to distribute apps to iOS devices.

Apple's monopoly power over software distribution on iOS devices appears to allow it to generate supra-normal profits from the App Store and its Services business. Apple CEO Tim Cook set a goal in 2017 to rapidly double the size of the Services business by the end of 2020.<sup>2116</sup> Apple met this goal by July 2020, six months ahead of schedule.<sup>2117</sup> The Services business accounted for nearly 18% of total revenue (\$46.2 billion) in fiscal year 2019. Services grew faster than Products in recent years, increasing by more than 41% since 2017.<sup>2118</sup> The Services category is also Apple's highest margin business at 63.7% in fiscal year 2019 and 67.2% for Apple's quarter ending in June 2020.<sup>2119</sup>

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<sup>2115</sup> See CEO Hearing Transcript at 52, 164 (statement of Tim Cook, CEO, Apple Inc.). See also Production of Apple, to H. Comm. on the Judiciary, HJC-APPLE-000012-13 (Oct. 14, 2019) (on file with Comm.).

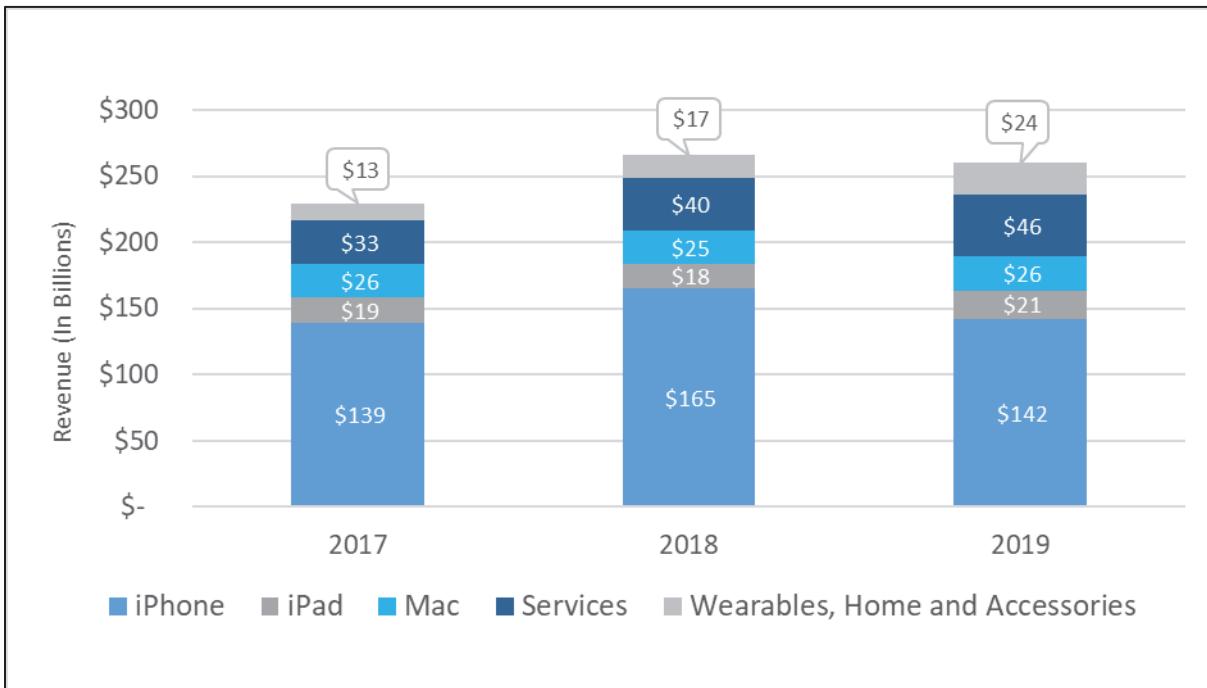
<sup>2116</sup> Anita Balakrishnan, *Tim Cook: Goal is to double Apple's services revenue by 2020*, CNBC (Jan. 31, 2017), <https://www.cnbc.com/2017/01/31/tim-cook-on-apple-earnings-call-double-services-revenue-by-2020.html>.

<sup>2117</sup> See Apple (AAPL) Q3 2020 Earnings Call Transcript, MOTLEY FOOL (July 31, 2020), <https://www.fool.com/earnings/call-transcripts/2020/07/31/apple-aapl-q3-2020-earnings-call-transcript.aspx>.

<sup>2118</sup> Apple Inc., Annual Report (Form 10-K) 19 (Sept. 28, 2019), [https://s2.q4cdn.com/470004039/files/doc\\_financials/2019/ar\\_10-K-2019-\(As-Filed\).pdf](https://s2.q4cdn.com/470004039/files/doc_financials/2019/ar_10-K-2019-(As-Filed).pdf).

<sup>2119</sup> Apple Inc., Annual Report (Form 10-K) 21 (Sept. 28, 2019), [https://s2.q4cdn.com/470004039/files/doc\\_financials/2019/ar\\_10-K-2019-\(As-Filed\).pdf](https://s2.q4cdn.com/470004039/files/doc_financials/2019/ar_10-K-2019-(As-Filed).pdf); Apple Inc., Quarterly Report (Form 10-Q) 28 (June 27, 2020), [https://s2.q4cdn.com/470004039/files/doc\\_financials/2020/q3\\_10-Q-Q3-2020-\(As-Filed\).pdf](https://s2.q4cdn.com/470004039/files/doc_financials/2020/q3_10-Q-Q3-2020-(As-Filed).pdf).

## Annual Revenue by Segment<sup>2120</sup>



Industry observers credit Apple’s rising valuation and future long-term value to its successful focus on growing the Services business.<sup>2121</sup> Apple has attributed the growth of Services as a driver of the firm’s profits from sales and an important factor supporting Apple’s overall margins as hardware sales slowed or declined.<sup>2122</sup> The company has consistently credited the App Store, licensing sales, and AppleCare for the success of Services.<sup>2123</sup>

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<sup>2120</sup> Prepared by the Subcomm. based on Apple Inc., Annual Report (Form 10-K) (2017–2019), <https://www.sec.gov/Archives/edgar/data/320193/000032019318000145/a10-k20189292018.htm>.

<sup>2121</sup> See e.g., Kifi Leswing, *Apple’s \$2 trillion value is proof that Tim Cook’s services plan worked*, CNBC (Aug. 19, 2020), <https://www.cnbc.com/2020/08/19/apples-2-trillion-value-proof-that-tim-cooks-services-plan-worked.html>; Anne Sraders, *As Apple stock tops \$500, bulls cite these key reasons it could still go higher*, FORTUNE (Aug. 24, 2020), <https://fortune.com/2020/08/24/apple-stock-tops-500-can-it-go-higher/>.

<sup>2122</sup> Apple Inc., Annual Report (Form 10-K) 22, 26 (Sept. 29, 2018), <https://www.sec.gov/Archives/edgar/data/320193/000032019318000145/a10-k20189292018.htm>; Apple Inc., Annual Report (Form 10-K) 22, 26 (Sept. 30, 2017), <https://www.sec.gov/Archives/edgar/data/320193/000032019317000070/a10-k20179302017.htm>.

<sup>2123</sup> Apple Inc., Annual Report (Form 10-K) 19 (Sept. 28, 2019), [https://s2.q4cdn.com/470004039/files/doc\\_financials/2019/ar\\_10-K-2019-\(As-Filed\).pdf](https://s2.q4cdn.com/470004039/files/doc_financials/2019/ar_10-K-2019-(As-Filed).pdf); Apple Inc., Annual Report (Form 10-K) 25 (Sept. 29, 2018), <https://www.sec.gov/Archives/edgar/data/320193/000032019318000145/a10-k20189292018.htm>; Apple Inc., Annual Report (Form 10-K) 25 (Sept. 30, 2017), <https://www.sec.gov/Archives/edgar/data/320193/000032019317000070/a10-k20179302017.htm>. AppleCare is Apple’s extended warranty products for Apple devices. See Jason Cross, *AppleCare+: Everything you need to know about Apple’s extended warranty program*, MACWORLD (Sept. 16, 2020), <https://www.macworld.com/article/3227045/applecare-warranty-faq.html>. In addition to the markets discussed in this section, the Committee sought information and continues to investigate competition and conduct in the resale and repair markets for Apple products.

b. Merger Activity

In 2019, Apple CEO Tim Cook told CNBC that Apple buys a new company every two to three weeks, with a focus on acquiring “talent and intellectual property.”<sup>2124</sup> In July 2020, Mr. Cook explained that Apple’s “approach on acquisitions has been to buy companies where we have challenges, and IP, and then make them a feature of the phone.”<sup>2125</sup> An Apple submission to the Subcommittee explains that it:

[H]as not embarked on a strategy of acquiring nascent competitors in service of its growth and market position. Instead, Apple’s acquisitions generally are meant to complement its product business by accelerating innovation and building out new features and technologies for Apple’s hardware and software offerings.<sup>2126</sup>

In 2020, Apple continued acquiring small firms, including artificial intelligence and virtual reality startups, an enterprise software maker, a contactless payment startup, and a weather application, among others.<sup>2127</sup> One of Apple’s largest transactions occurred in 2019, when it paid \$1 billion to acquire Intel’s smartphone modem business.<sup>2128</sup>

Apple has also recently acquired software companies to create a foundation from which it could launch new apps. After purchasing the digital magazine subscription service Texture in 2018, for example, Apple integrated most of Texture’s functionality into its own Apple News+ service, which debuted the following year.<sup>2129</sup> Similarly, one of Apple’s largest purchases to date—its \$3 billion

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<sup>2124</sup> Lauren Feiner, *Apple buys a company every few weeks, says CEO Tim Cook*, CNBC (May 6, 2019), <https://www.cnbc.com/2019/05/06/apple-buys-a-company-every-few-weeks-says-ceo-tim-cook.html>.

<sup>2125</sup> Kif Leswing, *Tim Cook says Apple buys innovation, not competitors*, CNBC (July 31, 2020), <https://www.cnbc.com/2020/07/31/tim-cook-contrasts-apple-ma-with-other-big-tech.html>.

<sup>2126</sup> Apple, *Apple: Distinctive Products with a Seamless, Integrated User Experience 2* (July 13, 2020) (on file with Comm.).

<sup>2127</sup> See Jordan Novet, *Apple buys an A.I. start-up that came from Microsoft co-founder Paul Allen’s research lab*, CNBC (Jan. 15, 2020), <https://www.cnbc.com/2020/01/15/apple-acquires-xnor-ai-startup-that-spun-out-of-allen-institute.html>; Mark Gurman, *Apple Acquires AI Startup to Better Understand Natural Language*, BLOOMBERG (Apr. 3, 2020), <https://www.bloomberg.com/news/articles/2020-04-03/apple-acquires-ai-startup-to-better-understand-natural-language>; Kif Leswing, *Apple buys virtual reality company NextVR*, CNBC (May 14, 2020), <https://www.cnbc.com/2020/05/14/apple-buys-virtual-reality-company-nextvr.html>; Kif Leswing, *Apple buys Fleetsmith, a company making it easier to deploy iPhones and Macs at workplaces*, CNBC (June 24, 2020), <https://www.cnbc.com/2020/06/24/apple-acquires-device-management-company-fleetsmith.html>; Jessica Bursztynsky, *Apple buys popular weather app Dark Sky and plans to shut down Android versions*, CNBC (Mar. 31, 2020), <https://www.cnbc.com/2020/03/31/apple-buys-popular-weather-app-dark-sky.html>; Mark Gurman, *Apple Buys Startup to Turn iPhones Into Payment Terminals*, BLOOMBERG (July 31, 2020), <https://www.bloomberg.com/news/articles/2020-08-01/apple-buys-startup-to-turn-iphones-into-payment-terminals>.

<sup>2128</sup> Press Release, Apple, *Apple to acquire the majority of Intel’s smartphone modem business* (July 25, 2019), <https://www.apple.com/newsroom/2019/07/apple-to-acquire-the-majority-of-intels-smartphone-modem-business/>.

<sup>2129</sup> Anita Balakrishnan, *Apple buys Texture, a digital magazine subscription service*, CNBC (Mar. 12, 2018), <https://www.cnbc.com/2018/03/12/apple-buys-texture-a-digital-magazine-subscription-service.html>.

acquisition of Beats Electronics in 2014—was instrumental to the 2015 launch of Apple Music.<sup>2130</sup> Apple sought to grow Apple Music quickly after its introduction. Apple pre-installed the service on iPhones and made it the only music service accessible through Siri, Apple’s virtual assistant. Apple also offered Apple Music with a free month trial period and made it available on Android devices. The strategy saw Apple gain 10 million paying subscribers within six months.<sup>2131</sup> Apple supplemented its music services business in 2018 by acquiring the music recognition app Shazam, and most recently in 2020 by acquiring podcast app Scout FM.<sup>2132</sup>

It is common for Apple to integrate apps it purchases into its own pre-existing apps or into the iOS mobile operating system. Examples include acquisitions of Swell, a podcast app that Apple acquired in 2014, and HopStop, a transit navigation app it acquired in 2013.<sup>2133</sup>

Apple has followed a similar strategy for integrating the Dark Sky weather app. Apple shut down Dark Sky’s Android app in August 2020 and plans to integrate the app’s features with the iPhone’s Weather widget on iOS 14.<sup>2134</sup> In addition to its app, Dark Sky supplied data to independent weather apps, like Carrot, Weather Line, and Partly Sunny. As a result of Apple’s takeover of Dark Sky, independent weather apps will lose access to the inexpensive, hyper-local weather data that Dark Sky supplied, leading some weather apps to shut down and others to rely on higher-priced suppliers for forecast data.<sup>2135</sup>

### c. Conduct

#### i. Commissions and In-App Purchases

The Subcommittee sought information regarding Apple’s policy of collecting commissions from apps sold through the App Store and purchases made in iOS apps. Apple charges a 30%

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<sup>2130</sup> Billy Steele, *Apple’s \$3 billion purchase of Beats has already paid off*, ENGADGET (May 28, 2019), <https://www.engadget.com/2019-05-28-apple-beats-five-years-later.html>.

<sup>2131</sup> Neth. Auth. For Consumers & Mkts. Study at 62.

<sup>2132</sup> Press release, Apple, *Apple acquires Shazam, offering more ways to discover and enjoy music* (Sept. 24, 2018), <https://www.apple.com/newsroom/2018/09/apple-acquires-shazam-offering-more-ways-to-discover-and-enjoy-music/>; Mark Gurman, *Apple Buys Startup That Creates Radio-Like Stations for Podcasts*, BLOOMBERG (Sept. 24, 2020), <https://www.bloomberg.com/news/articles/2020-09-24/apple-buys-startup-that-creates-radio-like-stations-for-podcasts>.

<sup>2133</sup> Chris Gayomali, *Swell Shuts Down Following Apple Acquisition*, FAST CO. (July 29, 2014), <https://www.fastcompany.com/3033698/swell-shuts-down-following-apple-acquisition>; Andrew Nusca, *Apple Maps vs. Google Maps heats up as Apple shuts down HopStop*, FORTUNE (Sept. 12, 2015), <https://fortune.com/2015/09/12/hopstop-apple-shutdown/>.

<sup>2134</sup> Hannah Klein, *The Dark Sky Android App Is Officially Kaput*, SLATE (Aug. 4, 2020), <https://slate.com/technology/2020/08/dark-sky-app-android-shuts-down.html>.

<sup>2135</sup> Jared Newman, *Apple’s Dark Sky acquisition could be bad news for indie weather apps*, FAST COMPANY (Apr. 2, 2020), <https://www.fastcompany.com/90485131/apples-dark-sky-acquisition-could-be-bad-news-for-indie-weather-apps>; but see CEO Hearing Transcript at 9 (response to Questions for the Record of Tim Cook, CEO, Apple) (noting Dark Sky will “continue to make its API available to Dark Sky’s existing customers until the end of 2021.”).

commission on paid apps—those that charge a fee for users to download—downloaded from the App Store. It also takes a 30% fee on in-app purchases (IAP) of “digital goods and services.”<sup>2136</sup> App subscriptions are charged a 30% commission for the first year and a 15% commission for subsequent years.<sup>2137</sup> Apps are not permitted to communicate with iOS users that the app may be available for purchase at a lower price outside the App Store, provide links outside of the app that may lead users to find alternative subscription and payment methods, or offer their own payment processing mechanism in the app to avoid using Apple’s IAP.<sup>2138</sup> Apps that violate Apple’s policies can be removed from the App Store, losing access to the only means of distributing apps to consumers with iOS devices.<sup>2139</sup>

Apple describes its policies as a standard industry practice and says that other app stores charge the same fees.<sup>2140</sup> In 2020, Apple funded a study that concluded that other software distribution platforms run by Google, Amazon, Samsung, Microsoft, and others charge identical or similar commissions on software downloads and transactions, and that commissions are common in other digital markets.<sup>2141</sup> Apple also highlighted that its commissions are lower than the cost of software distribution by brick-and-mortar retailers, which dominated the marketplace prior to the introduction of the App Store.<sup>2142</sup> The Apple-commissioned study explained Apple funds the App Store through a \$99

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<sup>2136</sup> *App Store: Dedicated to the best store experience for everyone*, APPLE, <https://www.apple.com/ca/ios/app-store/principles-practices/> (last visited Oct. 4, 2020).

<sup>2137</sup> *Id.*

<sup>2138</sup> See Innovation and Entrepreneurship Hearing at 1–2 (response to Questions for the Record of Kyle Andeer, Vice Pres., Corp. Law, Apple Inc.); Submission from ProtonMail, to H. Comm. on the Judiciary, 5 (Aug. 22, 2020) (on file with Comm.); Interview with Source 143 (Aug. 27, 2020).

<sup>2139</sup> See e.g., Sara Morrison, *Apple’s Fortnite ban, explained*, VOX: RECODE (Sept. 8, 2020), <https://www.vox.com/recode/2020/8/20/21373780/fortnite-epic-apple-lawsuit-app-store-antitrust>; Nick Statt, *Apple doubles down on controversial decision to reject email app Hey*, THE VERGE (June 18, 2020), <https://www.theverge.com/2020/6/18/21296180/apple-hey-email-app-basecamp-rejection-response-controversy-antitrust-regulation>.

<sup>2140</sup> Innovation and Entrepreneurship Hearing at 2 (Response to Questions for the Record of Kyle Andeer, Vice Pres., Corp. Law, Apple Inc.), <https://docs.house.gov/meetings/JU/JU05/20190716/109793/HHRG-116-JU05-20190716-SD037.pdf>. See also Mark Gurman, *Apple Defends App Store Revenue Take Ahead of Antitrust Hearing*, BLOOMBERG (July 22, 2020), <https://www.bloomberg.com/news/articles/2020-07-22/apple-defends-app-store-revenue-cut-ahead-of-antitrust-hearing>; David Pierce and Emily Birnbaum, *Apple defends its App Store tax ahead of antitrust hearings*, PROTOCOL (July 22, 2020), <https://www.protocol.com/apple-app-store-commission-study>.

<sup>2141</sup> See JONATHAN BORCK ET AL., *APPLE’S APP STORE AND OTHER DIGITAL MARKETPLACES: A COMPARISON OF COMMISSION RATES* 2, 5-6 (2020), [https://www.analysisgroup.com/globalassets/insights/publishing/apples\\_app\\_store\\_and\\_other\\_digital\\_marketplaces\\_a\\_comparison\\_of\\_commission\\_rates.pdf](https://www.analysisgroup.com/globalassets/insights/publishing/apples_app_store_and_other_digital_marketplaces_a_comparison_of_commission_rates.pdf).

<sup>2142</sup> See CEO Hearing Transcript at 30 (statement of Tim Cook, CEO, Apple Inc.); Letter from Kyle Andeer, Vice Pres., Corp. Law and Chief Compliance Officer, Apple Inc., to Hon. Jerrold Nader, Chairman, H. Comm. on the Judiciary, Hon. Jim Jordan, Ranking Member, H. Comm. on the Judiciary, Hon. David N. Cicilline, Chairman, Subcomm. on Antitrust, Commercial and Admin. Law of the H. Comm. on the Judiciary, Hon. F. James Sensenbrenner, Ranking Member, Subcomm. on Antitrust, Commercial and Admin. Law of the H. Comm. on the Judiciary, 3 (Sept. 21, 2020) ( on file with Comm.).

annual fee it charges to developers and \$299 for developers building enterprise apps, as well as the commission and fees collected on apps and in-app purchases.<sup>2143</sup>

Apple also noted that 84% of all apps distributed through the App Store pay no commissions or fees.<sup>2144</sup> Apple does not take a commission on purchases from apps like Uber or Etsy that sell “physical goods or services that will be consumed outside the app.”<sup>2145</sup> Apple also makes some exceptions to its rules and may change or update its rules.<sup>2146</sup> For example, Apple has an exception for “Reader” apps such as Netflix and Kindle that permit users to access content purchased outside the app, but do not allow for in-app subscriptions or purchases.<sup>2147</sup> Apple also makes exceptions for “third-party premium video apps” that integrate with Apple TV and other Apple services.<sup>2148</sup> Mr. Cook explained, “[t]oday, there are over 130 apps that participate in this program,” and “[t]he reduced 15% commission is available to all developers offering premium video content on the same terms as Amazon Prime Video, with the same qualification criteria.”<sup>2149</sup> Amazon Prime Video, Altice One, and Canal+ have been publicly confirmed as participants.<sup>2150</sup>

During the investigation, the Subcommittee received evidence from app developers regarding Apple’s commissions and fees for IAP. ProtonMail, a secure email provider, explained that Apple’s justification of its 30% commission overlooks the dynamics of the marketplace for distributing

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<sup>2143</sup> See JONATHAN BORCK ET AL., APPLE’S APP STORE AND OTHER DIGITAL MARKETPLACES: A COMPARISON OF COMMISSION RATES 4, n.5, Appendix A-3 (2020), [https://www.analysisgroup.com/globalassets/insights/publishing/apples\\_app\\_store\\_and\\_other\\_digital\\_marketplaces\\_a\\_comparison\\_of\\_commission\\_rates.pdf](https://www.analysisgroup.com/globalassets/insights/publishing/apples_app_store_and_other_digital_marketplaces_a_comparison_of_commission_rates.pdf).

<sup>2144</sup> See e.g., Innovation and Entrepreneurship Hearing at 68 (statement of Kyle Andeer, Vice Pres., Corp. Law, Apple Inc.); Letter from Timothy Powderly, Apple Inc., to Hon. David N. Cicilline, Chairman, Subcomm. on Antitrust, Commercial and Admin. Law of the H. Comm. on the Judiciary, and Hon. F. James Sensenbrenner, Ranking Member, Subcomm. on Antitrust, Commercial and Admin. Law of the H. Comm. on the Judiciary, 3 (July 15, 2019).

<sup>2145</sup> *App Store Review Guidelines 3.1.3(e): Goods and Services Outside of the App*, APPLE, <https://developer.apple.com/app-store/review/guidelines/#goods-and-services-outside-of-the-app> (last visited Sept. 27, 2020).

<sup>2146</sup> See e.g., Sarah Perez & Anthony Ha, *Apple revises App Store rules to permit game streaming apps, clarify in-app purchases and more*, TECHCRUNCH (Sept. 11, 2020), <https://techcrunch.com/2020/09/11/apple-revises-app-store-rules-to-permit-game-streaming-apps-clarify-in-app-purchases-and-more/>; Phillip Shoemaker, *Apple v. Everybody*, MEDIUM (Mar. 29, 2019), <https://medium.com/@phillipshoemaker/apple-v-everybody-5903039e3be>.

<sup>2147</sup> *App Store Review Guidelines 3.1.3(a): “Reader” Apps*, APPLE, <https://developer.apple.com/app-store/review/guidelines/#reader-apps> (last visited Sept. 27, 2020).

<sup>2148</sup> CEO Hearing Transcript at 8 (response to Questions for the Record of Tim Cook, CEO, Apple Inc.)

<sup>2149</sup> *Id.*

<sup>2150</sup> Nick Statt, *Apple now lets some video streaming apps bypass the App Store cut*, THE VERGE (Apr. 1, 2020), <https://www.theverge.com/2020/4/1/21203630/apple-amazon-prime-video-ios-app-store-cut-exempt-program-deal>. See also, Production of Apple, to H. Comm. on the Judiciary, HJC-APPLE-015111 (Nov. 1, 2016) (showing details of negotiations between Eddy Cue, Senior Vice President, Internet Software and Services, Apple, and Jeff Bezos, CEO, Amazon.) (on file with Comm.).

software to consumers with iOS devices—conflating practices that may be unremarkable in competitive markets but abusive in monopoly markets.<sup>2151</sup>

For example, personal computer (PC) users can install software from app stores run by Microsoft, Google, Amazon and others, or they can download software directly from the software developer’s website and bypass app stores altogether. Similarly, Apple’s Mac App Store is one of many options for Mac users to download software. While Samsung is a global leader in smartphones, the Samsung Galaxy Store is one of several app stores available on Samsung’s mobile devices. Google’s Play Store dominates app distribution on Android devices and is the most apt comparison to the App Store, but Google permits some competition via sideloading and alternative app stores.<sup>2152</sup>

In contrast, Apple owns the iOS operating system as well as the only means to distribute software on iOS devices. Using its role as operating system provider, Apple prohibits alternatives to the App Store and charges fees and commissions for some categories of apps to reach customers. It responds to attempts to circumvent its fees and commissions with removal from the App Store.<sup>2153</sup> Because of this policy, developers have no other option than to play by Apple’s rules to reach customers who own iOS devices. Owners of iOS devices have no alternative means to install apps on their phones. Apple notes that its 30% commission has remained static for most apps for more than a decade.<sup>2154</sup> A group of developers that filed a lawsuit against Apple because of this policy argue that the persistence of Apple’s 30% rate over time, particularly “despite the inevitable accrual of experience and economies of scale,” indicates there is insufficient competition.<sup>2155</sup> Additionally, as previously noted, there is little likelihood for new market entry in the mobile operating system or mobile app store markets to compel Apple to lower its rates.<sup>2156</sup>

Industry observers have also challenged Apple’s implicit claim that the iPhone was the start of the online software distribution market. For example, Mac and iOS developer Brent Simmons remarked that “when the App Store was created, developers were selling and distributing apps over the web, and it worked wonderfully,” noting that he began distributing software over the internet in the

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<sup>2151</sup> See Submission from ProtonMail, to H. Comm. on the Judiciary, 11–12 (Aug. 22, 2020) (on file with Comm.).

<sup>2152</sup> See *id.* Apple has pointed to these as benchmarks for the App Store. See JONATHAN BORCK ET AL., APPLE’S APP STORE AND OTHER DIGITAL MARKETPLACES: A COMPARISON OF COMMISSION RATES 4–6 (2020), [https://www.analysisgroup.com/globalassets/insights/publishing/apples\\_app\\_store\\_and\\_other\\_digital\\_marketplaces\\_a\\_comparison\\_of\\_commission\\_rates.pdf](https://www.analysisgroup.com/globalassets/insights/publishing/apples_app_store_and_other_digital_marketplaces_a_comparison_of_commission_rates.pdf).

<sup>2153</sup> See Submission from ProtonMail, to H. Comm. on the Judiciary, 5 (Aug. 22, 2020) (on file with Comm.).

<sup>2154</sup> See CEO Hearing Transcript at 52 (statement of Tim Cook, CEO, Apple Inc.); Letter from Kyle Andeer, Vice Pres., Corp. Law and Chief Compliance Officer, Apple Inc., to Hon. Jerrold Nader, Chairman, H. Comm. on the Judiciary, Hon. Jim Jordan, Ranking Member, H. Comm. on the Judiciary, Hon. David N. Cicilline, Chairman, Subcomm. on Antitrust, Commercial and Admin. Law of the H. Comm. on the Judiciary, and Hon. F. James Sensenbrenner, Ranking Member, Subcomm. on Antitrust, Commercial and Admin. Law of the H. Comm. on the Judiciary, 3 (Sept. 21, 2020) ( on file with Comm.).

<sup>2155</sup> Class Action Complaint at 2, Cameron v. Apple Inc., No. 5:19-cv-3074 (N.D. Cal. June 4, 2019).

<sup>2156</sup> See *infra* Section IV.

1990s.<sup>2157</sup> Software designer and technology writer John Gruber agreed, explaining that in the mid-1990s there was “a thriving market for software sold directly over a thing called ‘The Internet,’” and that Apple’s omission of the fact that “direct downloads and sales over the web” pre-dated the iPhone by more than a decade “is flat-out dishonest.”<sup>2158</sup>

Many developers have stressed that because Apple dictates that the App Store is the only way to install software on iOS devices and requires apps offering “digital goods and services” implement the IAP mechanism, that Apple has illegally tied IAP to the App Store.<sup>2159</sup> Consumers with iOS devices account for a disproportionately high amount of spending on apps—spending twice as much as Android users.<sup>2160</sup> Further, iOS users seldom switch to Android.<sup>2161</sup> Thus, developers cannot abandon the App Store—it is where the highest value customers are and will remain. As a result, developers say that Apple abuses its control of its valuable user base by prohibiting alternative payment processing options to compete with Apple’s IAP mechanism.

Developers further argue that Apple’s 30% commission from IAP is a “payment processing” fee, and not a distribution fee.<sup>2162</sup> In a submission to the Subcommittee, Match said “Apple distorts competition in payment processing by making access to its App Store conditional on the use of IAP for in-app purchases, thus excluding alternative payment processors. IAP eventually becomes the vessel through which Apple extracts its extraordinary commissions.”<sup>2163</sup> Two app developers that offer

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<sup>2157</sup> See Rob Pegoraro, *What Tim Cook Left Out Of His Version of App Store History*, FORBES (July 29, 2020), <https://www.forbes.com/sites/robpegoraro/2020/07/29/what-tim-cook-left-out-of-his-version-of-app-store-history/>.

<sup>2158</sup> John Gruber, *Parsing Tim Cook’s Opening Statement from Today’s Congressional Antitrust Hearing*, DARING FIREBALL (July 29, 2020), [https://daringfireball.net/2020/07/parsing\\_cooks\\_opening\\_statement](https://daringfireball.net/2020/07/parsing_cooks_opening_statement).

<sup>2159</sup> See e.g., Submission from Source 711, to H. Comm. on the Judiciary, Appendix A 4–8 (Oct. 15, 2019) (on file with Comm.); Submission from Source 202, to H. Comm. on the Judiciary, 22–41 (Oct. 18, 2018); Submission from Source 736, to H. Comm. on the Judiciary, 6–10 (Oct. 31, 2019) (on file with Comm.).

<sup>2160</sup> See *Global App Revenue Grew 23% Year-Over-Year Last Quarter to \$21.9 Billion*, SENSORTOWER (Oct. 23, 2019), <https://sensortower.com/blog/app-revenue-and-downloads-q3-2019>; Prachi Bhardwaj & Shayanne Gal, *Despite Android’s growing market share, Apple users continue to spend twice as much money on apps as Android users*, BUS. INSIDER (July 6, 2018), <https://www.businessinsider.com/apple-users-spend-twice-apps-vs-android-charts-2018-7>.

<sup>2161</sup> See *Mobile Operating System Loyalty: High and Steady*, CONSUMER INTEL. RESEARCH PARTNERS (Mar. 8, 2018), <http://files.constantcontact.com/150f9af2201/4bca9a19-a8b0-46bd-95bd-85740ff3fb5d.pdf>; *iPhone vs. Android – Cell Phone Brand Loyalty Survey 2019*, SELLCELL (Aug. 20, 2019), <https://www.sellcell.com/blog/iphone-vs-android-cell-phone-brand-loyalty-survey-2019/>; see also MORNINGSTAR EQUITY ANALYST REPORT, APPLE INC 3 (Aug. 6, 2020) (on file with Comm.) (“Recent survey data shows that iPhone customers are not even contemplating switching brands today. In a December 2018 survey by Kantar, 90% of U.S.-based iPhone users said they planned to remain loyal to future Apple devices.”); Martin Armstrong, *Most iPhone Users Never Look Back*, STATISTA (May 22, 2017), <https://www.statista.com/chart/9496/most-iphone-users-never-look-back/>.

<sup>2162</sup> See e.g., Competitors Hearing at 9 (statement of David Heinemeier Hansson, Founder and CTO, Basecamp); Interview with Source 143 (Aug. 27, 2020); Submission from Match Group, to H. Comm. on the Judiciary, MATCH-GRP\_00000168 (July 1, 2019) (on file with Comm.); Submission from Source 482, to H. Comm. on Judiciary, 9 (Oct. 15, 2019) (on file with Comm.).

<sup>2163</sup> Submission from Match Group, to H. Comm. on the Judiciary, MATCH\_GRP\_00000238 (Nov. 1, 2019) (on file with Comm.).

services that compete with Apple explained that IAP is a payment processing fee and not a distribution fee. Both pointed out that Apple does not charge apps for distribution, evidenced by the fact Apple admits distributing most apps for free. Instead, Apple generates revenue by adding a 30% processing fee on transactions in the App Store and using IAP.<sup>2164</sup> Apple’s Developer Program website explains that Apple does charge for distribution—it requires enrollment in the Apple Developer Program and payment of a \$99 fee to distribute apps on the App Store.<sup>2165</sup>

Apple responded that its “commission is not a payment processing fee” and that it “reflects the value of the App Store as a channel for the distribution of developers’ apps and the cost of many services” it incurs to maintain the App Store.<sup>2166</sup> It said that “[t]he commission also enables Apple to realize a return on its investment in the App Store and in Apple’s intellectual property, and to fund future App Store innovation.”<sup>2167</sup> Similarly, a study commissioned by Apple in 2020 explained that the annual fees paid by developers, commissions, and charges for in-app purchases fund investments in the App Store ecosystem, such as app review, developer tools, marketing, search functionality, application program interfaces, and software development kits.<sup>2168</sup> Apple has also argued that its App Store

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<sup>2164</sup> See Submission from ProtonMail, to H. Comm. on the Judiciary, 11 (Aug. 22, 2020) (on file with Comm.); Submission from Spotify, to H. Comm. on the Judiciary, Appendix A at 7–8 (Oct. 15, 2019) (on file with Comm.).

<sup>2165</sup> See *Apple Developer Program, How the Program Works*, APPLE, <https://developer.apple.com/programs/how-it-works/> (last visited Sept. 27, 2020) (“If you’re new to development on Apple Platforms, you can get started with our tools and resources for free. If you’re ready to build more advanced capabilities and distribute your apps on the App Store, enroll in the Apple Developer Program. The cost is 99 USD per membership year.”).

<sup>2166</sup> Letter from Kyle Andeer, Vice Pres., Corp. Law & Chief Compliance Officer, Apple Inc. to Hon. Jerrold Nadler, Chairman, H. Comm. on the Judiciary, Hon. Doug Collins, Ranking Member, H. Comm. on the Judiciary, Hon. David N. Cicilline, Chairman, Subcomm. on Antitrust, Commercial and Admin. Law of the H. Comm. on the Judiciary, and Hon. F. James Sensenbrenner, Ranking Member, Subcomm. on Antitrust, Commercial and Admin. Law of the H. Comm. on the Judiciary, 3 (Feb. 17, 2020) ( on file with Comm.), <https://docs.house.gov/meetings/JU/JU05/20200117/110386/HHRG-116-JU05-20200117-SD004.pdf>; see also Letter from Kyle Andeer, Vice Pres., Corp. Law and Chief Compliance Officer, Apple Inc., to Hon. Jerrold Nader, Chairman, H. Comm. on the Judiciary, Hon. Jim Jordan, Ranking Member, H. Comm. on the Judiciary, Hon. David N. Cicilline, Chairman, Subcomm. on Antitrust, Commercial and Admin. Law of the H. Comm. on the Judiciary, and Hon. F. James Sensenbrenner, Ranking Member, Subcomm. on Antitrust, Commercial and Admin. Law of the H. Comm. on the Judiciary, 3 (Sept. 21, 2020) ( on file with Comm.).

<sup>2167</sup> Apple, *Apple: Distinctive Products with a Seamless, Integrated User Experience* 14 (July 13, 2020) (on file with Comm.). See also Letter from Kyle Andeer, Vice Pres., Corp. Law and Chief Compliance Officer, Apple Inc., to Hon. Jerrold Nader, Chairman, H. Comm. on the Judiciary, Hon. Jim Jordan, Ranking Member, H. Comm. on the Judiciary, Hon. David N. Cicilline, Chairman, Subcomm. on Antitrust, Commercial and Admin. Law of the H. Comm. on the Judiciary, and Hon. F. James Sensenbrenner, Ranking Member, Subcomm. on Antitrust, Commercial and Admin. Law of the H. Comm. on the Judiciary, 3 (Sept. 21, 2020) ( on file with Comm.).

<sup>2168</sup> See JONATHAN BORCK ET AL., APPLE’S APP STORE AND OTHER DIGITAL MARKETPLACES: A COMPARISON OF COMMISSION RATES 2–3 (2020), [https://www.analysisgroup.com/globalassets/insights/publishing/apples\\_app\\_store\\_and\\_other\\_digital\\_marketplaces\\_a\\_comparison\\_of\\_commission\\_rates.pdf](https://www.analysisgroup.com/globalassets/insights/publishing/apples_app_store_and_other_digital_marketplaces_a_comparison_of_commission_rates.pdf); see also Letter from Kyle Andeer, Vice Pres., Corp. Law & Chief Compliance Officer, Apple Inc. to Hon. Jerrold Nadler, Chairman, H. Comm. on the Judiciary, Hon. Doug Collins, Ranking Member, H. Comm. on the Judiciary, Hon. David N. Cicilline, Chairman, Subcomm. on Antitrust, Commercial and Admin. Law of the H. Comm. on the Judiciary, and Hon. F. James Sensenbrenner, Ranking Member, Subcomm. on Antitrust, Commercial and Admin. Law of the H. Comm. on the Judiciary, 2 (Feb. 17, 2020) ( on file with Comm.), <https://docs.house.gov/meetings/JU/JU05/20200117/110386/HHRG-116-JU05-20200117-SD004.pdf>.

Developer Guidelines—including its requirement to use Apple’s in-app purchase mechanism—is “designed to keep the store safe for our users.”<sup>2169</sup>

Apple’s rationale for its commissions and fees has evolved over time. Its recent explanations of the basis for its 30% commission differs significantly from its explanation of its fee and revenue expectations in the early years of the App Store. Prior to the App Store’s debut in 2008, then-Apple CEO Steve Jobs explained “We don’t intend to make any money off the App Store . . . We’re basically giving all the money to the developers and the 30 percent that pays for running the store, that’ll be great.”<sup>2170</sup> In 2011, Apple Chief Financial Officer Peter Oppenheimer explained to Apple’s shareholders that Apple runs the App Store “just a little over break even.”<sup>2171</sup>

Apple’s financial reports indicate that the App Store is faring far better than the modest business Apple originally contemplated. According to a 2019 market analysis, Apple’s net revenue from the App Store is projected to be \$17.4 billion for fiscal year 2020.<sup>2172</sup> CNBC estimated the App Store had total sales of nearly \$50 billion in 2019, generating “about \$15 billion in revenue for Apple.” With \$50 billion in annual sales, CNBC explained “the App Store alone would be no. 64 on the Fortune 500, ahead of Cisco and behind Morgan Stanley.”<sup>2173</sup> An analytics firm concluded that Apple likely made \$15.5 billion from the App Store in 2018, and estimated \$18.8 billion for 2022. Bloomberg reported that analysts forecasting Apple’s third-quarter 2020 performance predicted growth from Services “up 15% from a year earlier,” and that growth would largely be attributable to the App Store and licensing, not new services.<sup>2174</sup> In addition to Apple’s commissions and fees for IAP, App Store revenue also includes an \$2.67 billion Apple would make through the \$99 annual fee paid by Apple’s 27 million iOS developers.<sup>2175</sup> Apple also reportedly made \$9 billion in 2018 and \$12 billion in 2019

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<sup>2169</sup> Kif Leswing, *Apple sued by Fortnite maker after kicking the game out of the App Store for payment policy violations*, CNBC (Aug. 13, 2020), <https://www.cnbc.com/2020/08/13/apple-kicks-fortnite-out-of-app-store-for-challenging-payment-rules.html>.

<sup>2170</sup> Peter Cohen, ‘App Store’ will distribute iPhone software, MACWORLD (Mar. 6, 2008), <https://www.macworld.com/article/1132402/appstore.html>.

<sup>2171</sup> Daniel Eran Dilger, *Inside Apple’s shareholder meeting and Q&A with Tim Cook*, APPLE INSIDER (Feb. 23, 2011), [https://appleinsider.com/articles/11/02/23/tim\\_cook\\_presides\\_over\\_annual\\_apple\\_shareholder\\_meeting](https://appleinsider.com/articles/11/02/23/tim_cook_presides_over_annual_apple_shareholder_meeting).

<sup>2172</sup> Eric J. Savitz, *App Stores Could Be Ripe for Regulation. Here’s Who Benefits if Commissions Fall*, BARRONS (July 25, 2019), <https://www.barrons.com/articles/news-updates-51599747657>.

<sup>2173</sup> Kif Leswing, *Apple’s App Store had gross sales around \$50 billion last year, but growth is slowing*, CNBC (Jan. 8, 2020), <https://www.cnbc.com/2020/01/07/apple-app-store-had-estimated-gross-sales-of-50-billion-in-2019.html>.

<sup>2174</sup> Mark Gurman, *Apple’s New Services Off to a Slow Start in First Year*, BLOOMBERG (July 28, 2020), <https://www.bloombergquint.com/business/apple-s-new-services-off-to-a-slow-start-in-first-year>.

<sup>2175</sup> See Letter from Kyle Andeer, Vice Pres., Corp. Law and Chief Compliance Officer, Apple Inc., to Hon. Jerrold Nader, Chairman, H. Comm. on the Judiciary, Hon. Jim Jordan, Ranking Member, H. Comm. on the Judiciary, Hon. David N. Cicilline, Chairman, Subcomm. on Antitrust, Commercial and Admin. Law of the H. Comm. on the Judiciary, and Hon. F. James Sensenbrenner, Ranking Member, Subcomm. on Antitrust, Commercial and Admin. Law of the H. Comm. on the Judiciary, 3 (Sept. 21, 2020) ( on file with Comm.). (“[T]here are more than 1.8 million apps on the App Store, and a thriving community of more than 27 million iOS developers.”); *Developer Support, Purchase and Activation*, APPLE,

to set Google as the default search engine on the Safari browser.<sup>2176</sup> Revenue from setting Google as Safari’s default search engine is attributed to Apple’s Services business, which is the business unit that includes the App Store.<sup>2177</sup>

In an interview with Subcommittee staff, Phillip Shoemaker, former director of app review for the App Store, estimated that Apple’s costs for running the App Store is less than \$100 million. Other analysts estimate that the App Store has significantly higher profits. A gaming developer explained that the fees it pays Apple’s add up to millions of dollars—or even tens or hundreds of millions of dollars for some developers—far in excess of the developer’s estimate of Apple’s costs of reviewing and hosting those apps.<sup>2178</sup> Although only estimates, these figures indicate that as the mobile app economy has grown, Apple’s monopoly power over app distribution on iPhones permits the App Store to generate supra-normal profits. These profits are derived by extracting rents from developers, who either pass on price increases to consumers, or reduce investments in innovative new services. Apple’s ban on rival app stores and alternative payment processing locks out competition, boosting Apple’s profits from a captured ecosystem of developers and consumers.<sup>2179</sup>

To address this concern without compromising the security or quality of the App Store, some developers argue in favor of allowing third-party payment processors like PayPal, Square, and Stripe to compete in the App Store. They explain that the most likely competitors are already trusted and widely used for e-commerce transactions.<sup>2180</sup> David Heinemeier Hansson, the Founder and CTO of Basecamp, testified at the Subcommittee’s fifth hearing that Apple’s market power allows it to keep fees “exorbitantly high.”<sup>2181</sup> By comparison, he noted that other markets, such as credit card processes, are “only able to sustain a 2 percent fee for merchants. Apple, along with Google, has been able to charge

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<https://developer.apple.com/support/purchase-activation/> (last visited Sept. 27, 2020) (“The Apple Developer Program annual fee is \$99 USD and the Apple Developer Enterprise Program annual fee is \$299 USD”).

<sup>2176</sup> See Lisa Marie Segarra, *Google to Pay Apple \$12 Billion to Remain Safari’s Default Search Engine in 2019: Report*, FORTUNE (Sept. 29, 2018), <https://fortune.com/2018/09/29/google-apple-safari-search-engine/>.

<sup>2177</sup> See Mark Gurman, *Apple’s New Services Off to a Slow Start in First Year*, BLOOMBERG (July 28, 2020), <https://www.bloombergquint.com/business/apple-s-new-services-off-to-a-slow-start-in-first-year>.

<sup>2178</sup> Interview with Source 143 (Aug. 27, 2020).

<sup>2179</sup> Dr. Carl Shapiro of the University of California, Berkeley—the former top economist for the Justice Department’s Antitrust Division under the Obama Administration—has noted that persistently high corporate profits that are not eroded by competitive forces over time are an indicator of market power. It also suggests the rise of incumbency rents, or the earning of excess profits “by firms whose positions are protected by high barriers to entry.” Carl Shapiro, *Antitrust in a Time of Populism*, 61 INT’L J. INDUS. ORG. 714, 733–737 (2018), <https://faculty.haas.berkeley.edu/shapiro/antitrustpopulism.pdf>.

<sup>2180</sup> Submission from ProtonMail, to H. Comm. on the Judiciary, 13 (Aug. 22, 2020) (on file with Comm.).

<sup>2181</sup> Competitors Hearing at 8 (statement of David Heinemeier Hansson, Founder and CTO, Basecamp); see also Interview with Source 88 (May 12, 2020).

an outrageous 30 percent for years on end.”<sup>2182</sup> Several other firms observed that Apple’s control over app distribution allows it to extract high fees on a minority of apps, and that competition for processing payments would drive prices down. For example, developers explain that payment processing typically costs less than 5% of the transaction value.<sup>2183</sup> Before the App Store, one developer reportedly explained that “[w]e typically paid about 5%—not 30%—to a payment processor,” and it “worked just as well for small developers as for large.”<sup>2184</sup>

Other developers have noted that alternative payment processing providers charge significantly lower rates than Apple’s fee for IAP. Match estimates that Apple’s expenses related to payment processing “justify charging no more than 3.65% of revenue.”<sup>2185</sup> Some app developers would prefer to implement in-house payment processing. In August 2020, Epic Games introduced a direct payment option in its Fortnite app, allowing gamers to elect to use Apple’s IAP or pay Epic directly. Epic’s payment processing option that charged consumers 10%, a 20% discount from purchases using IAP.<sup>2186</sup> In response, Apple disabled updates for Fortnite for violating the App Store Guidelines.<sup>2187</sup>

Developers have also detailed that Apple attempts lock in its fees by preventing apps from communicating with customers about alternatives. Under the App Store Guidelines, apps may not provide any information “that direct[s] customers to purchasing mechanisms other than in-app purchase.”<sup>2188</sup> They also cannot communicate with iOS app customers about purchasing methods other than IAP.<sup>2189</sup>

In an interview with Subcommittee staff, one developer that offers a “freemium” app—a popular business model where the app is available for free but users can purchase upgrades—recalled that it sent an email to customers with iOS devices with information about how to upgrade to a paid subscription, including a link to the service’s website where customers could upgrade their

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<sup>2182</sup> Competitors Hearing at 8 (statement of David Heinemeier Hansson, Founder and CTO, Basecamp); *see also* Interview with Source 873 (May 12, 2020).

<sup>2183</sup> *See e.g.*, Competitors Hearing at 8 (statement of David Heinemeier Hansson, Founder and CTO, Basecamp); Submission from Source 202, to H. Comm. on the Judiciary, 15 (Oct. 18, 2018) (on file with Comm.).

<sup>2184</sup> Rob Pegoraro, *What Tim Cook Left Out Of His Version of App Store History*, Forbes (July 29, 2020), <https://www.forbes.com/sites/robpegoraro/2020/07/29/what-tim-cook-left-out-of-his-version-of-app-store-history/>.

<sup>2185</sup> Submission of Source 736, to H. Comm. on the Judiciary, 6 (Oct. 31, 2019) (on file with Comm.).

<sup>2186</sup> *See* Andrew Webster, *Epic offers new direct payment in Fortnite on iOS and Android to get around app store fees*, THE VERGE (Aug. 13, 2020), <https://www.theverge.com/2020/8/13/21366259/epic-fortnite-vbucks-mega-drop-discount-iphone-android>.

<sup>2187</sup> Nick Statt, *Apple just kicked Fortnite off the App Store*, THE VERGE (Aug. 13, 2020), <https://www.theverge.com/2020/8/13/21366438/apple-fortnite-ios-app-store-violations-epic-payments>.

<sup>2188</sup> *App Store Developer Guidelines 3.1.1: In-App Purchase*, APPLE, <https://developer.apple.com/app-store/review/guidelines/#in-app-purchase> (last visited Sept. 27, 2020).

<sup>2189</sup> *Apple, App Store Developer Guidelines 3.1.3: Other Purchase Methods*, APPLE, <https://developer.apple.com/app-store/review/guidelines/#other-purchase-methods> (last visited Sept. 27, 2020).

subscription. Apple responded by threatening to remove the app from the App Store and blocked its updates, including security patches.<sup>2190</sup> A game developer described Apple’s rules as reaching outside the App Store itself to police the communications that an app can have with its own customers, including communications intended to improve customer experience and offer discounts.<sup>2191</sup>

In his questions for the record for the Subcommittee’s second hearing, Representative W. Gregory Steube (R-FL) asked Apple about banning communications to customers by app providers. Apple responded that its restrictions on communications between apps and customers are to ensure Apple can collect commissions and “prevent free-riding.”<sup>2192</sup> Apple explained that it restricts developers from using the iOS ecosystem to “direct customers they have acquired through Apple to purchase content elsewhere for the purpose of avoiding Apple’s rightful commission.”<sup>2193</sup> The company described its policy as a prohibition “on developers promoting, *via* the App Store, transactions outside the App Store,” and said Apple’s policies were no different than most other retailers.<sup>2194</sup>

In June 2020, the European Commission announced that it had opened a formal antitrust investigation of Apple’s App Store rules and conduct, including “the mandatory use of Apple’s own proprietary in-app purchase system and restrictions on the availability of developers to inform iPhone and iPad users of alternative cheaper purchasing possibilities outside of apps.”<sup>2195</sup>

As Apple has emphasized growing its Services business, app developers and technology writers have observed Apple is increasingly insistent that apps implement IAP—cutting Apple in on revenue from more developers—and threatening apps that do not comply with expulsion from the App Store.<sup>2196</sup> In June 2020, an email app developed by Basecamp called HEY was approved by the App Store and then abruptly told it would have to implement Apple in-app purchasing or face removal from the platform.<sup>2197</sup> While HEY’s app updates were eventually allowed, Apple did force it to create a free

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<sup>2190</sup> Submission from ProtonMail, to H. Comm. on the Judiciary, 5 (Aug. 22, 2020) (on file with Comm.).

<sup>2191</sup> Interview with Source 143 (Aug. 27, 2020).

<sup>2192</sup> Innovation and Entrepreneurship Hearing at 2 (Response to Questions for the Record of Kyle Andeer, Vice Pres., Corp. Law, Apple Inc.).

<sup>2193</sup> *Id.* at 1.

<sup>2194</sup> *Id.* at 1–2.

<sup>2195</sup> Press Release, Eur. Comm’n, Antitrust: Commission opens investigations into Apple’s App Store rules (June 16, 2020), [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_20\\_1073](https://ec.europa.eu/commission/presscorner/detail/en/ip_20_1073).

<sup>2196</sup> See e.g., Jeremy Howitz, *Apple’s antitrust woes stem from its obsessions with control and money*, VENTURE BEAT (Aug. 7, 2020), <https://venturebeat.com/2020/08/07/apples-antitrust-woes-stem-from-its-obsessions-with-control-and-money/> (“Apple might act like it’s too large to care about money, but the company has recently sniped at developers who have succeeded on iOS without paying Apple anything, while doing as much as possible to push other developers — and users — into coughing up recurring subscription fees for both apps and games.”).

<sup>2197</sup> See e.g., Nilay Patel, *Apple approves Hey email app, but the fight’s not over*, THE VERGE (June 22, 2020), <https://www.theverge.com/2020/6/22/21298552/apple-hey-email-app-approval-rules-basecamp-launch>; Rob Pegoraro, *Apple To Basecamp’s Hey: Expect to Pay Us If You Want To Sell Privacy*, FORBES (June 17, 2020),

trial option for iOS customers.<sup>2198</sup> Basecamp Founder and CTO David Heinemeier Hansson observed that Apple threatened and abused small app developers for years, and that the conflict with HEY amounted to a “shakedown.”<sup>2199</sup> In August 2020, Apple denied WordPress the ability to update its app unless it implemented IAP, even though the WordPress app does not sell anything. Apple ultimately backed off its demands only after the issue received negative attention on social media.<sup>2200</sup> ProtonMail told the Subcommittee that its privacy-focused email app competes with an Apple’s email app, and after being in the App Store for two years, Apple demanded the ProtonMail implement IAP or be removed from the App Store. ProtonMail complied to avoid damage to its business.<sup>2201</sup>

Internal Apple communications reviewed by Subcommittee staff indicate that Apple has leveraged its power over the App Store to require developers to implement IAP or risk being thrown out of the App Store.<sup>2202</sup> Then-Apple CEO Steve Jobs once explained, “there will be some roadkill because of it. I don’t feel guilty” when confronted with developer complaints about Apple’s commission and requirement to use IAP.<sup>2203</sup> The Netherlands Authority for Consumers and Markets (ACM) has noted that some app developers attribute Apple’s inconsistent application of its rules to inattention to apps that are infrequently updated, and that Apple likely focuses on requiring IAP for high revenue-generating apps.<sup>2204</sup>

In response to the COVID-19 pandemic, some businesses moved physical events online, often booking through an app and holding the event through a video chat application. Educators have also shifted resources online, including through apps. *The New York Times* reported that Apple demanded a 30% commission from these virtual class offerings. As a result, one company stopped offering virtual classes to users of its iOS app. The *Times* reported that Apple threatened Airbnb that it would remove

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<https://www.forbes.com/sites/robpegoraro/2020/06/17/apple-to-basecamps-hey-expect-to-pay-us-if-you-want-to-sell-privacy/>.

<sup>2198</sup> Chaim Gartenberg, *Hey opens its email service to everyone as Apple approves its app for good*, THE VERGE (June 25, 2020), <https://www.theverge.com/2020/6/25/21302931/hey-email-service-public-launch-apple-approves-app-fight-policy-price>.

<sup>2199</sup> *Apple v. Hey*, HEY, <https://hey.com/apple> (last visited Sept. 27, 2020).

<sup>2200</sup> See Sean Hollister, *WordPress founder claims Apple cut off updates to his completely free app because it wants 30 percent*, THE VERGE (Aug. 21, 2020), <https://www.theverge.com/2020/8/21/21396316/apple-wordpress-in-app-purchase-tax-update-store>; Sean Hollister, *Apple apologizes to WordPress, won’t force the free app to add purchases after all*, THE VERGE (Aug. 23, 2020), <https://www.theverge.com/2020/8/22/21397424/apple-wordpress-apology-iap-free-ios-app>.

<sup>2201</sup> Submission from ProtonMail, to H. Comm. on the Judiciary, 5 (Aug. 22, 2020) (on file with Comm.).

<sup>2202</sup> See Production of Apple, to H. Comm. on the Judiciary, HJC-APPLE-014701-702 (Nov. 23, 2010) (on file with Comm.).

<sup>2203</sup> Patrick McGee & Javier Espinoza, *Apple conflict with developers escalates ahead of worldwide conference*, FINANCIAL TIMES (June 22, 2020) <https://www.ft.com/content/733ae8d4-e516-4418-9998-30414c368c6f>.

<sup>2204</sup> See Neth. Auth. for Consumers & Mkts. at 89, 92–93.

its app from the App Store if Airbnb did not comply with Apple's demand for a share of its revenues.<sup>2205</sup>

In interviews with Subcommittee staff, multiple app developers confirmed the *The New York Times'* reporting.<sup>2206</sup> Airbnb spoke with Subcommittee staff and described conversations with the App Store team in which Apple said it had observed an uptick in the number of apps offering virtual classes in lieu of in-person classes due to the COVID-19 pandemic. As a result, Apple began canvassing the App Store to require app developers implement IAP, entitling Apple to take 30% of in-app sales. Airbnb explained that Apple's commission, plus compliance with Apple's pricing tiers for in-app purchases would ultimately result in a 50-60% price increase for consumers.<sup>2207</sup>

Technology industry observers have reported similar conduct. On June 17, 2020, Ben Thompson, a prominent business analyst, wrote that app developers told him that Apple was demanding 30% commissions from businesses that have had to change their business models from live, in-person events to virtual events as a result of the COVID-19 pandemic. Mr. Thompson quoted one developer that explained Apple was taking advantage of small businesses in the midst of the ongoing public health crisis.<sup>2208</sup>

At the Subcommittee's hearing on July 29, 2020, Chairman Jerrold Nadler (D-NY) asked Mr. Cook about the allegations that Apple was canvassing the App Store to extract commissions from businesses that have been forced to change their business model in order to survive during the pandemic. Mr. Cook responded that Apple "would never take advantage" of the pandemic, but justified the conduct, explaining that the app developers were now offering what Apple defined as a "digital service" and Apple was entitled to commissions.<sup>2209</sup> Responding to *The New York Times'* reporting on the matter, Apple defended its conduct, explaining "[t]o ensure every developer can create and grow a successful business, Apple maintains a clear, consistent set of guidelines that apply equally to everyone."<sup>2210</sup>

App developers affected by these changes said that after Apple's conduct became public it created an exception to its policies until the end of 2020. However, on January 1, 2021 those

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<sup>2205</sup> Jack Nicas & David McCabe, *Their Business Went Virtual. Then Apple Wanted a Cut.*, N.Y. TIMES (July 28, 2020), <https://www.nytimes.com/2020/07/28/technology/apple-app-store-airbnb-classpass.html>.

<sup>2206</sup> See e.g., Interview with Airbnb; Interview with Source 147 (Sept. 10, 2020).

<sup>2207</sup> See Interviews with Airbnb.

<sup>2208</sup> See Ben Thompson, *Xscale and ARM in the Cloud, Hey Versus Apple, Apple's IAP Campaign*, STRATECHERY (June 17, 2020), <https://stratechery.com/2020/xscale-and-arm-in-the-cloud-hey-versus-apple-apples-iap-campaign/>.

<sup>2209</sup> CEO Hearing Transcript at 156 (statement of Tim Cook, CEO, Apple Inc.)

<sup>2210</sup> Jack Nicas & David McCabe, *Their Business Went Virtual. Then Apple Wanted a Cut.*, N.Y. TIMES (July 28, 2020), <https://www.nytimes.com/2020/07/28/technology/apple-app-store-airbnb-classpass.html>.

businesses will be required to implement IAP or remove the ability to book virtual classes in their apps.<sup>2211</sup>

Developers have submitted evidence that Apple's commissions and fees, combined with the lack of competitive alternatives to the App Store and IAP harm competition and consumers. For instance, Match called Apple's fee for IAP "unreasonable," leading to higher prices for consumers and "an inferior user experience and a reduction of innovation."<sup>2212</sup> One developer that offers an app that directly competes with Apple told the Subcommittee that it was forced to raise prices to pay Apple's commission.

As a result, it was less competitive and fewer iOS users purchased its service. The company said that because apps often have small margins, they cannot absorb Apple's fees, so the price consumers pay for its app is more than 25% higher than it would otherwise be.<sup>2213</sup> Small developers described Apple's 30% cut "onerous."<sup>2214</sup> Epic Games, which recently filed an antitrust complaint against Apple, has told a federal court that Apple's fees and commissions force developers "to increase the prices they charge in order to pay Apple's app tax. There is no method app developers can use to avoid this tax."<sup>2215</sup> Mac and iOS app developer Brent Simmons explained Apple's fees reduce innovation and lead to fewer apps in the marketplace, observing:

[T]he more money Apple takes from developers, the fewer resources developers have. When developers have to cut costs, they stop updating apps, skimp on customer support, put off hiring a graphic designer, etc. They decide not to make apps at all that they might have made were it easier to be profitable.<sup>2216</sup>

In Apple's internal documents and communications, the company's senior executives previously acknowledged that IAP requirement would stifle competition and limit the apps available to Apple's customers. For example, in an email conversation with other senior leaders at Apple about whether to require IAP for e-Book purchases, then-CEO Steve Jobs concluded, "I think this is all pretty simple—iBooks is going to be the only bookstore on iOS devices. We need to hold our heads

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<sup>2211</sup> Interview with Airbnb (Aug. 31, 2020).

<sup>2212</sup> Submission by Match Group, to H. Comm. on the Judiciary, MATCH\_GRP\_00000236, MATCH\_GRP\_00000238 (Oct. 23, 2019) (on file with Comm.).

<sup>2213</sup> Submission from ProtonMail, to H. Comm. on the Judiciary, 6 (Aug. 22, 2020) (on file with Comm.); *see also* Neth. Auth. for Consumers & Mkts. Study at 91.

<sup>2214</sup> Interview with Source 143 (Aug. 27, 2020).

<sup>2215</sup> Complaint at 3, Epic Games, Inc. v. Apple Inc., 4:20-cv-05640 (N.D.Cal. 2020), <https://cdn2.unrealengine.com/apple-complaint-734589783.pdf>.

<sup>2216</sup> Brent Simmons, *I Got Teed Off and Went on a Long Rant About This Opinion Piece on the App Store*, INESSENTIAL (July 28, 2020), <https://inessential.com/2020/07/28/untrue>.

high. One can read books bought elsewhere, just not buy/rent/subscribe from iOS without paying us, which we acknowledge is prohibitive for many things.”<sup>2217</sup>

International competition authorities have also examined the competitive effects of Apple’s App Store commissions and fees. The Australian Competition and Consumer Commission (ACCC) observed that Apple’s control over app distribution on iOS devices gives it leverage to extract commissions from apps, reducing the revenue that app providers like media businesses can invest in content.<sup>2218</sup> The ACM, which completed a comprehensive study of mobile app stores in 2019, noted that developers have increased prices to account for commissions and fees.<sup>2219</sup> The ACM also remarked that Apple’s 30% commission on in-app purchases may distort competition because Apple’s requirement to use IAP often applies to apps competing directly against Apple’s apps. As a result, app developers with small margins cannot simply absorb the cost of Apple’s commission, so they increase their price, which gives Apple’s competing service an advantage.<sup>2220</sup> Developers ACM spoke with “mentioned that it is highly unlikely that it is a coincidence that these digital services that are required to use IAP face competition from Apple’s own apps, or possibly will do in the future.”<sup>2221</sup>

ii. Pre-Installed Apps, Default Settings, Private App Programming Interfaces (APIs), and Device Functionality

In addition to investigating whether Apple abuses its monopoly power over app distribution to leverage high commissions and fees from app developers, Subcommittee also examined whether Apple abuses its role as iOS and App Store owner to preference its own apps or harm rivals. The Committee requested information regarding Apple’s practice of locking-in Apple’s apps as defaults on the iPhone, and Subcommittee Chairman Cicilline requested information from Apple regarding its practice of pre-installing its own apps on the iPhone. Subcommittee Chairman Cicilline also sought input on whether Apple’s policy of reserving certain application programming interfaces (APIs) and access to certain device functionalities for its apps gives Apple’s services a competitive advantage.

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<sup>2217</sup> Production of Apple, to H. Comm. on the Judiciary, HJC-APPLE-014816-18 (Feb. 6, 2011) (on file with Comm.).

<sup>2218</sup> See Austl. Competition & Consumer Comm’n at 223, 225 (2019); see also Ben Thompson, *Antitrust, the App Store, and Apple*, STRATECHERY (Nov. 27, 2018), <https://www.stratechery.com/2018/antitrust-the-app-store-and-apple> (“Apple makes a huge amount of money, with massive profit margins, by virtue of its monopolistic control of the App Store. It doesn’t make the games or the productivity applications or the digital content, it simply skims off 30%, and not because its purchasing experience is better, but because it is the only choice.”).

<sup>2219</sup> Neth. Auth. for Consumers & Mkts. Study at 91.

<sup>2220</sup> See *id.* at 7.

<sup>2221</sup> *Id.* at 89.

It is widely understood that consumers usually do not change default options.<sup>2222</sup> This is the case “even if they can freely change them or choose a competitive alternative.”<sup>2223</sup> Subcommittee staff reviewed communications between Apple employees that demonstrate an understanding inside Apple that pre-loading apps could be advantageous when competing against third-party apps.<sup>2224</sup>

Apple pre-installs about 40 Apple apps into current iPhone models.<sup>2225</sup> Several of these apps are set as defaults and are “operating system apps” that are “integrated into the phone’s core operating system and part of the combined experience of iOS and iPhone.”<sup>2226</sup> According to Apple, users can delete most of these pre-installed apps.<sup>2227</sup> Apple does not pre-install any third-party apps, and until the September 2020 release of iOS 14, it did not allow consumers to select third-party web browser or email apps as defaults.<sup>2228</sup> Apple says that it is making “more than 250,000 APIs available to developers in iOS 14.”<sup>2229</sup>

A report by the Netherlands Authority for Consumers and Markets (ACM) on mobile app stores recently observed that app providers believe they “have a strong disadvantage” when competing with Apple’s apps due to the fact that those services are often pre-installed on iOS devices.<sup>2230</sup> The study also noted that “pre-installation of apps can create a so-called status-quo bias. Consumers are more likely to use the apps that are pre-installed on their smartphones.”<sup>2231</sup> Consumers will download apps that compete with pre-installed apps only when there is a noted quality difference, and even then, lower-quality pre-installed apps will still enjoy an advantage over third-party apps.<sup>2232</sup> The European Commission’s 2019 report on competition in digital markets explained that privileging access to APIs

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<sup>2222</sup> See e.g., Dig. Competition Expert Panel Report at 36 (“[C]onsumers in digital markets display strong preferences for default options and loyalty to brands they know.”); Stigler Report at 8, 41 (“Consumers do not replace the default apps on their phones... and take other actions that may look like poor decisions if those consumers like to choose among options and experience competition.”).

<sup>2223</sup> JOHN BERGMAYER, PUBLIC KNOWLEDGE, TENDING THE GARDEN: HOW TO ENSURE THAT APP STORES PUT USERS FIRST 19 (2020), [https://www.publicknowledge.org/wp-content/uploads/2020/06/Tending\\_the\\_Garden.pdf](https://www.publicknowledge.org/wp-content/uploads/2020/06/Tending_the_Garden.pdf).

<sup>2224</sup> See Production of Apple, to H. Comm. on the Judiciary, HJC-APPLE-011035–36 (Mar. 12, 2019) (on file with Comm.) (noting that Apple pre-loading software products on to iOS devices “would clearly be even more problematic” than “Apple releasing its apps via the App Store....”).

<sup>2225</sup> CEO Hearing Transcript at 1 (response to Questions for the Record of Tim Cook, CEO, Apple Inc.).

<sup>2226</sup> *Id.* at 2.

<sup>2227</sup> *Id.*

<sup>2228</sup> *Id.* See also Press Release, Apple, Apple reveals new developer technologies to foster the next generation of apps (June 22, 2020), <https://www.apple.com/newsroom/2020/06/apple-reveals-new-developer-technologies-to-foster-the-next-generation-of-apps/> (“Email and browser app developers can offer their apps as default options, selectable by users.”).

<sup>2229</sup> CEO Hearing Transcript at 3 (response to Questions for the Record of Tim Cook, CEO, Apple Inc.).

<sup>2230</sup> Neth. Auth. for Consumers & Mkts. Study at 5, 15, 85–86.

<sup>2231</sup> *Id.* at 84 (citing Press Release, Eur. Comm’n, Antitrust: Commission Fines Google €4.34 Billion for Illegal Practices Regarding Android Mobile Devices to Strengthen Dominance of Google’s Search Engine (July 18, 2018), [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_18\\_4581](https://ec.europa.eu/commission/presscorner/detail/en/ip_18_4581)).

<sup>2232</sup> *Id.*

can provide an advantage to those with greater access over those with more innovative products.<sup>2233</sup> Public Knowledge concluded that Apple's control of iOS and the App store enables it to advantage its own apps and services by pre-installing them on iOS devices, leading consumers to rely on the pre-installed apps rather than looking for alternatives in the App Store.<sup>2234</sup>

Mobile operating system providers develop APIs to permit apps to access a device's features, such as the microphone, camera, or GPS, or other software programs and determine what information on the device apps can access.<sup>2235</sup> Public APIs for iOS are made available to app developers to ensure apps are integrated with the device and function as intended. These public APIs also control the services that are opened via default when users click a link to open a webpage or an address to open a map application. Private APIs access functionality that is not publicly released. Apple is permitted to use the private APIs on iOS devices, but third-party developers are not.<sup>2236</sup>

Apple's public APIs default to Apple's pre-installed applications. As a result, when an iPhone user clicks on a link, the webpage opens in the Safari Browser, a song request opens in Apple Music, and clicking on an address launches Apple Maps.<sup>2237</sup> With some recent exceptions, iPhone users are unable to change this default setting,<sup>2238</sup> however they are able to send app-specific links from inside many popular apps. For example, a person can share a link to a song in a third-party music streaming app such that it would open that song in the same app if it is already downloaded on the recipient's smartphone. One app developer has argued, however, that Apple uses its control over iOS to give its own apps and services advantages that are not available to competitors. For example, the developer explained that for years it was barred from integrating with Siri, Apple's intelligent virtual assistant that is built into Apple devices. Although Siri can now integrate with the app, users must explicitly request Siri launch the third-party app, otherwise it will default to launch Apple's service.<sup>2239</sup>

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<sup>2233</sup> Eur. Comm'n Competition Report at 34.

<sup>2234</sup> JOHN BERGMAYER, PUBLIC KNOWLEDGE, TENDING THE GARDEN: HOW TO ENSURE THAT APP STORES PUT USERS FIRST 20 (2020), [https://www.publicknowledge.org/wp-content/uploads/2020/06/Tending\\_the\\_Garden.pdf](https://www.publicknowledge.org/wp-content/uploads/2020/06/Tending_the_Garden.pdf). See also DIG. COMPETITION EXPERT PANEL, PUBLIC RESPONSES TO CALL FOR EVIDENCE FROM ORGANISATIONS, RESPONSE OF BRITISH BROAD. CORP. 44 (2018), [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/785549/DCEP\\_Public\\_responses\\_to\\_call\\_for\\_evidence\\_from\\_organisations.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/785549/DCEP_Public_responses_to_call_for_evidence_from_organisations.pdf) (“Apple's control of devices and operating system allows it to pre-load and favour its own services i.e. Apple Podcasts.”).

<sup>2235</sup> Competition & Mkts. Auth. Report at 42; Neth. Auth. for Consumers & Mkts. Study at 59.

<sup>2236</sup> See Thomas Claburn, *Apple Frees a Few Private API, Makes them Public*, THE REGISTER (June 13, 2017), [https://www.theregister.com/2017/06/13/apple\\_inches\\_toward\\_openness/](https://www.theregister.com/2017/06/13/apple_inches_toward_openness/).

<sup>2237</sup> Neth. Auth. for Consumers & Mkts. Study at 59–60.

<sup>2238</sup> See Press Release, Apple, *Apple Reveals New Developer Technologies to Foster the Next Generation of Apps* (June 22, 2020), <https://www.apple.com/newsroom/2020/06/apple-reveals-new-developer-technologies-to-foster-the-next-generation-of-apps/> (“Email and browser app developers can offer their apps as default options, selectable by users.”).

<sup>2239</sup> Submission from Source 711, to H. Comm. on the Judiciary, Source 711-00000080 at 23 (Oct. 15, 2019) (on file with Comm.).

Like setting advantageous defaults and pre-installing its own apps, Apple is also able to preference its own services by reserving access to APIs and certain device functionalities for itself. ACM and technology reporters have both noted that “private APIs have the potential to give Apple apps a competitive advantage,” and that “Apple has for a long time favored its own services through APIs.”<sup>2240</sup> For example, from the release of iOS 4.3 until iOS 8, “third-party developers had to rely on the UIWebView API to render web pages in iOS apps, while Apple gave its own apps access to a private, faster API,” and as a result, “Google’s mobile version of Chrome for iOS could not compete with Apple’s mobile version of Safari in terms of speed.”<sup>2241</sup>

Apple’s mobile payments service, Apple Pay, is an example of an in-house app that enjoys an advantage due to its ability to access certain functionalities, such as near-field communication (NFC), on the iPhone that are off limits to third-party apps. According to Apple, “NFC is an industry-standard, contactless technology” that enables communications between the mobile device and payment terminal.<sup>2242</sup> Apple Pay uses the iPhone’s NFC chip to allow users to make contactless payments at retail outlets that use the technology.<sup>2243</sup> However, Apple blocks access for third-party apps. In June 2020 the European Commission opened a formal antitrust investigation into Apple’s conduct in the mobile payments market, including “Apple’s limitation of access to the Near Field Communication (NFC) functionality (‘tap and go’) on iPhones for payments in stores.”<sup>2244</sup> In response to questions from Subcommittee Chairman Cicilline and Representative Kelly Armstrong (D-ND) about Apple’s treatment of third-party mobile payment apps and access to the iPhone’s NFC chip, Apple said that it limits access to the NFC chip to protect the security of the iPhone and has detailed the differences between Apple’s treatment of Apple Pay and third-party mobile payment apps.<sup>2245</sup>

The advantage Apple provides Apple Pay may be heightened during the COVID-19 pandemic. Due to the novel coronavirus, consumers have accelerated their adoption of contactless payments, with more than half of global consumers preferring contactless payments over cash or traditional credit cards.<sup>2246</sup> In April 2020, MasterCard reported a 40% rise in use of contactless payments, with the trend

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<sup>2240</sup> Thomas Claburn, *Apple Frees a Few Private API, Makes them Public*, THE REGISTER (June 13, 2017), [https://www.theregister.com/2017/06/13/apple\\_inches\\_toward\\_openness/](https://www.theregister.com/2017/06/13/apple_inches_toward_openness/). See also Neth. Auth. for Consumers & Mkts. Study at 82.

<sup>2241</sup> Thomas Claburn, *Apple Frees a Few Private API, Makes them Public*, THE REGISTER (June 13, 2017), [https://www.theregister.com/2017/06/13/apple\\_inches\\_toward\\_openness/](https://www.theregister.com/2017/06/13/apple_inches_toward_openness/).

<sup>2242</sup> *Apple Pay Security and Privacy Overview*, APPLE, <https://support.apple.com/en-us/HT203027> (last visited Oct. 4, 2020).

<sup>2243</sup> *Id.*

<sup>2244</sup> Press Release, Eur. Comm’n, Antitrust: Commission Opens Investigation into Apple Practices Regarding Apple Pay (June 16, 2020) [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_20\\_1075](https://ec.europa.eu/commission/presscorner/detail/en/ip_20_1075).

<sup>2245</sup> CEO Hearing Transcript at 1, 3 (response to Questions for the Record of Tim Cook, CEO, Apple Inc.).

<sup>2246</sup> See DYNATA, GLOBAL CONSUMER TRENDS: COVID-19 EDITION, THE NEW NORMAL, A BREAKTHROUGH FOR CONTACTLESS PAYMENTS 2 (2020), <http://info.dynata.com/rs/105-ZDT-791/images/Dynata-Global-Consumer-Trends-COVID-19-The-New-Normal-Breakthrough-for-Contactless-Payments.pdf>. See also Press Release, Eur. Comm’n, Antitrust: Commission Opens Investigation into Apple Practices Regarding Apple Pay (June 16, 2020)

expected to continue after the pandemic. MasterCard CEO Ajay Banga explained the trend was driven by shoppers “looking for a quick way to get in and out of stores without exchanging cash, touching terminals, or anything else.”<sup>2247</sup> Apple itself has capitalized on the perception that contactless is the safest way to make transactions, marketing Apple Pay as “a safer way to pay that helps you avoid touching buttons or exchanging cash.”<sup>2248</sup>

Like Apple Pay, Safari is another pre-installed app that enjoys advantages over rivals. Safari is Apple’s default browser on iOS and Mac devices. When someone using an Apple device clicks on a website link, the webpage opens in the Safari browser.<sup>2249</sup> Until the September 2020 release of iOS 14, Apple did not allow consumers to select third-party web browser as a default.<sup>2250</sup> This was unique to iOS. Other mobile device operating systems allow the user to set a default browser across all applications.<sup>2251</sup>

Apple’s policies require alternative browsers apps for iOS (iPhone) to use Apple’s WebKit browser engine. As a result, all competing web browser companies must rebuild their product to make it available for iOS users.<sup>2252</sup> Additionally, browser engines are used in other applications that link to web content, such as email applications.<sup>2253</sup> Market participants explained to Subcommittee staff that these guidelines cost significant internal resources and create a hurdle for market entry on iOS. These requirements also make alternative browsers on iOS less technically distinct from Safari limiting

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[https://ec.europa.eu/commission/presscorner/detail/en/ip\\_20\\_1075](https://ec.europa.eu/commission/presscorner/detail/en/ip_20_1075) (“Executive Vice-President Margrethe Vestager, in charge of competition policy, said: ‘Mobile payment solutions are rapidly gaining acceptance among users of mobile devices, facilitating payments both online and in physical stores. This growth is accelerated by the coronavirus crisis, with increasing online payments and contactless payments in stores.’”).

<sup>2247</sup> Kate Rooney, *Contactless payments jump 40% as shoppers fear germs on cash and credit cards, Mastercard says*, CNBC (Apr. 29, 2020) <https://www.cnbc.com/2020/04/29/mastercard-sees-40percent-jump-in-contactless-payments-due-to-coronavirus.html>.

<sup>2248</sup> *Apple Pay*, APPLE, <https://www.apple.com/apple-pay/> (last visited Sept. 26, 2020).

<sup>2249</sup> Neth. Auth. for Consumers & Mkts. Study at 59–60.

<sup>2250</sup> See Mark Gurman, *Apple’s Default iPhone Apps Give It Growing Edge Over App Store Rivals*, BLOOMBERG (Oct. 2, 2019), <https://www.bloomberg.com/news/articles/2019-10-02/iphone-ios-users-can-t-change-default-apps-safari-mail-music>; Press Release, Apple, Apple reveals new developer technologies to foster the next generation of apps (June 22, 2020), <https://www.apple.com/newsroom/2020/06/apple-reveals-new-developer-technologies-to-foster-the-next-generation-of-apps/> (“Email and browser app developers can offer their apps as default options, selectable by users.”).

<sup>2251</sup> See e.g., *Google Chrome Help*, GOOGLE

<https://support.google.com/chrome/answer/95417?co=GENIE.Platform%3DAndroid&hl=en-GB> (last visited Sept. 26, 2020); *Support*, MOZILLA, <https://support.mozilla.org/en-US/kb/make-firefox-default-browser-android> (last visited Sept. 26, 2020); *Support*, MICROSOFT, <https://support.microsoft.com/en-us/help/4028606/windows-10-change-your-default-browser> (last visited Sept. 26, 2020).

<sup>2252</sup> *App Store Review Guidelines 2.5.6*, APPLE: DEVELOPER, <https://developer.apple.com/app-store/review/guidelines/#software-requirements> (last visited Sept. 26, 2020) (“Apps that browse the web must use the appropriate WebKit framework and WebKit Javascript.”).

<sup>2253</sup> See Michael Krasnov, *Browser Engine Diversity or Internet of Google*, EVERDAY.CODES (Dec. 15 2019), <https://everyday.codes/google/browser-engine-diversity-or-internet-of-google/>.

product differentiation.<sup>2254</sup> Further, market participants expressed concern that because Apple mandates the use of WebKit, as opposed to allowing developers an option, that WebKit has become slower to innovate and adopt standards.<sup>2255</sup>

At the Subcommittee's second hearing, Chairman Cicilline asked Apple about its policies related to web browser engines. Apple responded: "By requiring use of WebKit, Apple can provide security updates to all our users quickly and accurately, no matter which browser they decide to download from the App Store."<sup>2256</sup> While market participants agree that Apple's WebKit mandates would allow for easier updates to browser apps, there is disagreement about whether WebKit is measurably less secure than other browser engines.<sup>2257</sup>

The ACM has noted app providers have limited access to some APIs "that are essential for the functioning of apps. In certain cases, these functionalities are, however, used by Apple for their own apps,"<sup>2258</sup> which may limit competitive alternatives to Apple's products and services.<sup>2259</sup>

In January 2020, Kirsten Daru, Chief Privacy Office and General Counsel of Tile offered testimony to Subcommittee about this dynamic.<sup>2260</sup> Tile is a company that makes hardware and software that helps people find lost items.<sup>2261</sup> Tile testified that for years it successfully collaborated with Apple. However, in 2019 reports surfaced that Apple planned a launch a hardware product to compete with Tile.<sup>2262</sup> In her testimony, Ms. Daru said that Apple's 2019 release of iOS 13 harmed Tile's service and user experience while simultaneously introducing a new pre-installed Apple finder app called Find My.<sup>2263</sup> Changes to iOS 13 made it more difficult for Tile's customers to set up the service, requiring several confusing steps to grant Tile permission to track the phone's location.<sup>2264</sup> Meanwhile, Apple's Find My app was pre-installed on iOS devices and activated by default during

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<sup>2254</sup> Interview with Source 269 (July 23, 2019) ("Apple prohibits competitors from deploying their own web browsing engines on its mobile operating system. Web browsing engines provide the distinctive features of a web browser. Apple forces competitors to base their web browsers on a reduced version of its own web browser engine, 'WebKit'.").

<sup>2255</sup> See Owen Williams, *Apple is Trying to Kill Web Technology*, ONEZERO (Nov. 7, 2019), <https://onezero.medium.com/apple-is-trying-to-kill-web-technology-a274237c174d>.

<sup>2256</sup> Innovation and Entrepreneurship Hearing at 2 (response to Questions for the Record of Kyle Andeer, Vice Pres., Corp. Law, Apple Inc.).

<sup>2257</sup> See Andy Greenberg, *How Safari and iMessage Have Made iPhones Less Secure*, WIRED (Sept. 9, 2019), <https://www.wired.com/story/ios-security-imessage-safari/>.

<sup>2258</sup> Neth. Auth. for Consumers & Mkts. Study at 85–86.

<sup>2259</sup> *Id.* at 103.

<sup>2260</sup> See Competitors Hearing (statement of Kirsten Daru, Chief Privacy Officer & Gen. Counsel, Tile, Inc.).

<sup>2261</sup> *Id.* at 1.

<sup>2262</sup> See Guilherme Rambo, *Apple revamping Find My Friends & Find My iPhone in unified app, developing Tile-like personal item tracking*, 9TO5MAC (Apr. 17, 2019), <https://9to5mac.com/2019/04/17/find-my-iphone-revamp/>.

<sup>2263</sup> Competitors Hearing at 2 (statement of Kirsten Daru, Chief Privacy Officer & Gen. Counsel, Tile, Inc.).

<sup>2264</sup> *Id.*

iOS installation. Users are unable to opt out of Find My's location tracking "unless they go deep into Apple's labyrinthine menu of settings."<sup>2265</sup> Tile's response to the Subcommittee's Questions for the Record included detailed location permission flow comparisons between Tile and Find My.<sup>2266</sup> Tile explained that as a result of Apple's changes to iOS 13 it saw significant decreases in users and a steep drop off in users enabling the proper settings on iOS devices.<sup>2267</sup>

A group of app developers wrote to Apple CEO Tim Cook in 2019 arguing that Apple's new location notification permission polices will hurt their businesses and accused Apple of acting anticompetitively because it was treating its own services differently:

The developers conclude their email by asserting that Apple's own apps don't have to jump through similar hoops to get access to user location. An Apple app called Find My for tracking the location of other iPhone users, for example, bypasses the locating tracking requests that apps from outside developers must go through, the email reads. Instead, Find My gains location access through a process that occurs as users install the new operating system.<sup>2268</sup>

The app developers—including Tile, Arity, Life360, Happn, Zenly, Zendrive, and Twenty—explained that this gives Apple products that compete against their apps an advantage. "Apple says Find My and other apps are built into iOS and that it doesn't see a need to make location-tracking requests from users for the apps after they install the operating system."<sup>2269</sup> Apple also differentiates Find My by pointing out that "Find My" stores user location data *locally* on the user's iPhone, and Apple only transmits the location up on the user's request.<sup>2270</sup>

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<sup>2265</sup> Reed Albergotti, *Apple says recent changes to operating system improve user privacy, but some lawmakers see them as an effort to edge out its rivals*, WASH. POST (Nov. 26, 2019), <https://www.washingtonpost.com/technology/2019/11/26/apple-emphasizes-user-privacy-lawmakers-see-it-an-effort-edge-out-its-rivals/>; *see also* Competitors Hearing at 3 (statement of Kirsten Daru, Chief Privacy Officer & Gen. Counsel, Tile, Inc.).

<sup>2266</sup> Competitors Hearing at 4–14 (response to Questions for the Record of Kirsten Daru, Chief Privacy Officer & Gen. Counsel, Tile, Inc.).

<sup>2267</sup> Competitors Hearing at 6 (response to Questions for the Record of Kirsten Daru, Chief Privacy Officer & Gen. Counsel, Tile, Inc.); Interview with Kirsten Daru, Vice President and General Counsel, Tile Inc. (July 10, 2020).

<sup>2268</sup> Aaron Tilley, *Developers Call Apple Privacy Changes Anti-Competitive*, THE INFO. (Aug. 16, 2019), <https://www.theinformation.com/articles/developers-call-apple-privacy-changes-anti-competitive>.

<sup>2269</sup> *Id.*

<sup>2270</sup> Letter from Kyle Andeer, Vice Pres., Corp. Law & Chief Compliance Officer, Apple Inc., to Hon. Jerrold Nadler, Chairman, H. Comm. on the Judiciary, Hon. Doug Collins, Ranking Member, H. Comm on the Judiciary, Hon. David N. Cicilline, Chairman, Subcomm. on Antitrust, Commercial and Admin. Law of the H. Comm. on the Judiciary, and Hon. F. James Sensenbrenner, Ranking Member, Subcomm. on Antitrust, Commercial and Admin. Law of the H. Comm. on the Judiciary, 3 (Feb. 17, 2020), <https://docs.house.gov/meetings/JU/JU05/20200117/110386/HHRG-116-JU05-20200117-SD004.pdf>.

In response to the Subcommittee’s questions at its second hearing in July 2019, Apple responded and explained that the iOS 13 changes give users more control over background location tracking by apps. Apple also explained that turning on location tracking to Apple’s Find My service was “essential” for users, and that the disparate treatment between Find My and Tile was due to the fact that data from Find My remains on the device, while Tile stores data externally.<sup>2271</sup> Additionally, during Apple’s June 2020 World Wide Developers Conference, Apple announced that the Find My app would work with third-party finder hardware like Tile’s.<sup>2272</sup> However, Apple’s service would require companies like Tile to abandon their apps and the ability to differentiate their service from Apple’s and other competitors.<sup>2273</sup> Apple’s solution would continue to put Tile and other apps and hardware developers offering finder services at a competitive disadvantage.<sup>2274</sup>

### iii. App Search Rankings

In response to extensive reporting on the subject, Subcommittee staff has also examined the competitive effects of Apple’s search rankings in its App Store. In 2019, the *Wall Street Journal* and *The New York Times* both conducted extensive investigations and reported that Apple appeared to be favoring its apps in the App Store search results.<sup>2275</sup> The *Wall Street Journal* explained that “Apple’s mobile apps routinely appear first in search results ahead of competitors in its App Store, a powerful advantage that skirts some of the company’s rules on search rankings.”<sup>2276</sup> *The New York Times* reported that six years of analysis of App Store search rankings found Apple-owned apps ranked first for at least 700 common search terms. “Some searches produced as many as 14 Apple apps before showing results from rivals,” although app developers could pay Apple to place ads at the top of the

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<sup>2271</sup> See *id.* at 2.

<sup>2272</sup> See Ben Lovejoy, *Comment: This week’s keynote quietly tackled five of Apple’s antitrust issues*, 9TO5MAC (Jun. 24, 2020), <https://9to5mac.com/2020/06/24/apples-antitrust-issues-2/>.

<sup>2273</sup> See Interview with Kirsten Daru, Vice President and General Counsel, Tile Inc. (July 10, 2020); APPLE, FIND MY NETWORK ACCESSORY SPECIFICATION, DEVELOPER PREVIEW: RELEASE R1, 14, [https://images.fandroid.com/wp-content/uploads/2020/06/Find\\_My\\_network\\_accessory\\_protocol\\_specification.pdf](https://images.fandroid.com/wp-content/uploads/2020/06/Find_My_network_accessory_protocol_specification.pdf) (prohibiting “an accessory that supports the Find My network accessory protocol” from “operat[ing] simultaneously on the Find My network and another finder network....”).

<sup>2274</sup> Interview with Kirsten Daru, Vice Pres. and Gen. Counsel, Tile Inc. (Jun. 26, 2020). See Reed Albergotti, *Amid antitrust scrutiny, Apple makes quiet power moves over developers*, WASH. POST (July 24, 2020), <https://www.washingtonpost.com/technology/2020/07/24/apple-find-my-competition/>.

<sup>2275</sup> See Tripp Mickle, *Apple Dominates App Store Search Results, Thwarting Competitors*, WALL ST. J (July 23, 2019), <https://www.wsj.com/articles/apple-dominates-app-store-search-results-thwarting-competitors-11563897221>; Jack Nicas & Keith Collins, *How Apple’s Apps Topped Rivals in the App Store it Controls*, N.Y. TIMES (Sept. 9, 2019), <https://www.nytimes.com/interactive/2019/09/09/technology/apple-app-store-competition.html>.

<sup>2276</sup> Tripp Mickle, *Apple Dominates App Store Search Results, Thwarting Competitors*, WALL ST. J (July 23, 2019), <https://www.wsj.com/articles/apple-dominates-app-store-search-results-thwarting-competitors-11563897221>.

search results.<sup>2277</sup> Searches for the app titles of competing apps even resulted in Apple’s apps ranked first.<sup>2278</sup>

Apple’s apps “ranked first in more than 60% of basic searches, such as for ‘maps’” and “Apple apps that generate revenue through subscriptions or sales, like Music or Books, showed up first in 95% of searches related to those apps.”<sup>2279</sup> *The Wall Street Journal* noted that growing revenue from its apps is core to Apple’s strategy of offsetting sluggish hardware sales by increasing revenue from its Services business.<sup>2280</sup>

Rival app developers slipped down the search rankings as Apple introduced new services in their product categories. For example, Spotify had long been the top search result for the query “music,” but Apple Music quickly became the top search result shortly after it joined the App Store in June 2016. By the end of 2018, eight of Apple’s apps appeared in the first eight search results for “music,” and Spotify had fallen to the 23rd result. Similarly, Audiobooks.com was the top ranked result for “audiobooks” for nearly two years but was overtaken by Apple Books shortly after Apple began marketing for Books. Audiobooks explained to the *Wall Street Journal* that losing the top search ranking to Apple “triggered a 25% decline in Audiobooks.com’s daily app downloads.”<sup>2281</sup>

The reporting on App Store search also revealed that Apple may also advantage its apps by holding them to a different standard when they appear in the App Store search rankings. Apple told *The Wall Street Journal* “it uses 42 factors to determine where apps rank,” and that the four most important factors are “downloads, ratings, relevance, and ‘user behavior,’” with user behavior the most important factor because it measures how often users select and download an app.<sup>2282</sup> Approximately forty of Apple’s apps come preinstalled on iPhones. These apps do not have reviews and consumers cannot rate them. Mr. Cook explained at the Subcommittee’s hearing that Apple’s “apps that are integrated into the iPhone are not reviewable by users on the App Store.”<sup>2283</sup> Apple has also said that its search algorithm works the same for all apps, including its own.<sup>2284</sup>

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<sup>2277</sup> Jack Nicas & Keith Collins, *How Apple’s Apps Topped Rivals in the App Store it Controls*, N.Y. TIMES (Sept. 9, 2019), <https://www.nytimes.com/interactive/2019/09/09/technology/apple-app-store-competition.html>.

<sup>2278</sup> Tripp Mickle, *Apple Dominates App Store Search Results, Thwarting Competitors*, WALL ST. J (July 23, 2019), <https://www.wsj.com/articles/apple-dominates-app-store-search-results-thwarting-competitors-11563897221>.

<sup>2279</sup> *Id.*

<sup>2280</sup> *Id.*

<sup>2281</sup> *Id.*

<sup>2282</sup> *Id.*

<sup>2283</sup> CEO Hearing Transcript at 2 (response to Questions for the Record of Tim Cook, CEO, Apple Inc.).

<sup>2284</sup> See Tripp Mickle, *Apple Dominates App Store Search Results, Thwarting Competitors*, WALL ST. J (July 23, 2019), <https://www.wsj.com/articles/apple-dominates-app-store-search-results-thwarting-competitors-11563897221>.

Despite the fact that Apple’s pre-installed apps do not have ratings or reviews—factors that Apple says are most influential in determining app ranking—many of Apple’s pre-installed apps “still tend to be ranked first, even when users search for exact titles of other apps.”<sup>2285</sup> For example, Apple Books has no reviews or rankings and appears first in a search for “books,” while competing apps have tens-of-thousands of customer reviews and ratings of 4.8 or 4.9 stars on Apple’s five-star rating system.<sup>2286</sup> A search by Subcommittee staff of terms “music,” “news,” “TV,” and “podcast” returned Apple Music, News, TV, and Podcasts as top ranked search results although those apps do not have any reviews or ranking.<sup>2287</sup>

Despite the lack of reviews or rankings, Apple told the *Wall Street Journal* that “the No. 1 position for Books in a ‘books’ search is reasonable, since it is an exact name match.”<sup>2288</sup> Philip Schiller, Apple’s Senior Vice President, Worldwide Marketing who oversees the App Store and Eddy Cue, Apple’s Senior Vice President Internet and Software Services said “there was nothing underhanded about the algorithm the company had built to display search results in the store,”<sup>2289</sup> and that Apple’s apps tend to rank highly because they are popular and their generic names like Books and Music closely match common search terms.<sup>2290</sup>

It appears that Apple does not apply the same rule to third-party apps. Documents reviewed by Subcommittee staff show that Apple previously punished non-Apple apps that attempted to “cheat” the app store rankings. Apple determined that at least one third-party app had achieved its high search ranking because its name was a generic name that was also a common search term. Apple’s employees determined it was cheating to give an app the name of common search term.

In February 2018, Apple’s App Store search team noted that an app named “Photo Editor—Stylo” was the top ranked result when users searched the App Store for “photo editor.”<sup>2291</sup> In an email thread with Philip Schiller, Apple’s Senior Vice President, Worldwide Marketing, an Apple employee wrote that “[s]ince the app name matched a broad query term like ‘photo editor’ the developer was able to game the query with a direct name match.”<sup>2292</sup> The Apple employee explained that “[t]he app has

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<sup>2285</sup> *Id.*

<sup>2286</sup> Search Results: “books,” iOS APP STORE (Sept. 17, 2020).

<sup>2287</sup> Search Results: “music,” “news,” “TV,” “podcast,” iOS APP STORE (Sept. 17, 2020).

<sup>2288</sup> Tripp Mickle, *Apple Dominates App Store Search Results, Thwarting Competitors*, WALL ST. J (July 23, 2019), <https://www.wsj.com/articles/apple-dominates-app-store-search-results-thwarting-competitors-11563897221>.

<sup>2289</sup> Jack Nicas & Keith Collins, *How Apple’s Apps Topped Rivals in the App Store it Controls*, N.Y. TIMES (Sept. 9, 2019), <https://www.nytimes.com/interactive/2019/09/09/technology/apple-app-store-competition.html>.

<sup>2290</sup> *Id.*; see also Apple, *Apple: Distinctive Products with a Seamless, Integrated User Experience* 23 (July 13, 2020) (on file with Comm.) (“Because many of Apple’s apps are named after generic topics (such as Music, Maps, and Podcasts), those apps benefit from functional queries that have essentially become navigational.”).

<sup>2291</sup> Production of Apple, to H. Comm. on the Judiciary, HJC-APPLE-008082-86 (Feb. 9, 2018) (on file with Comm.).

<sup>2292</sup> *Id.*

been added to the Search Penalty Box for rank demotion,” and the action was labeled as complete.<sup>2293</sup> Additional action was slated to disable the initial boost that new apps are given in the app store if the app name is an “exact match to broad queries.”<sup>2294</sup> Here, Apple punished an app for the same conduct it said justified Apple’s position atop the App Store rankings.

Apple’s position as the provider of iOS enabled it to designate the App Store as the sole means for app developers to distribute software to iPhone users. Apple’s public statements, including testimony by Mr. Cook that Apple’s apps “go through the same rules” as more than 1.7 million third-party apps appear to be inconsistent with Apple’s actual practices.<sup>2295</sup> In this case, Apple leveraged its control of iOS and the App Store to give its own apps preferential treatment, and applied a different set of rules than third-party apps, punishing them for the very conduct Apple engaged in. Subcommittee staff did not have access to additional evidence from Apple to determine how widespread this practice is within the company.

#### iv. Competitively Sensitive Information

In addition to investigating allegations Apple engages in self-preferencing in the App Store, the Committee sought information regarding whether Apple exploits third-party developers that rely on distribution in the App Store. Developers have alleged that Apple abuses its position as the provider of iOS and operator of the App Store to collect competitively sensitive information about popular apps and then build competing apps, or integrate the popular app’s functionality into iOS.<sup>2296</sup> The practice is known as “Sherlocking.” The antitrust laws do not protect app developers from competition, and platforms should continue to innovate and improve their products and services. However, Sherlocking can be anticompetitive in some instances.<sup>2297</sup>

Some app developers have complained that Apple leverages its control of iOS and the App Store to glean business intelligence that enables it to better compete against third-party apps.<sup>2298</sup> For

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<sup>2293</sup> *Id.*

<sup>2294</sup> *Id.*

<sup>2295</sup> CEO Hearing Transcript at 176 (statement of Tim Cook, CEO, Apple Inc.).

<sup>2296</sup> See e.g., Brian Heater, *The makers of Duet Display and Luna on life after Apple’s Sidecar*, TECHCRUNCH (Jun. 7, 2019), <https://techcrunch.com/2019/06/07/the-makers-of-duet-display-and-luna-on-life-after-apples-sidecar/>.

<sup>2297</sup> See JOHN BERGMAYER, PUBLIC KNOWLEDGE, TENDING THE GARDEN: HOW TO ENSURE THAT APP STORES PUT USERS FIRST 21, 58 (2020), [https://www.publicknowledge.org/wp-content/uploads/2020/06/Tending\\_the\\_Garden.pdf](https://www.publicknowledge.org/wp-content/uploads/2020/06/Tending_the_Garden.pdf).

<sup>2298</sup> See e.g., Reed Albergotti, *How Apple uses its App Store to copy the best ideas*, WASH POST (Sept. 5, 2019), <https://www.washingtonpost.com/technology/2019/09/05/how-apple-uses-its-app-store-copy-best-ideas/>.

William Gallagher, *Developers talk about being ‘Sherlocked’ as Apple uses them ‘for market research’*, APPLE INSIDER (Jun. 6, 2019), <https://appleinsider.com/articles/19/06/06/developers-talk-about-being-sherlocked-as-apple-uses-them-for-market-research>; John Patrick Pullen, *Why These People Are Upset About Apple’s Latest Updates*, TIME (Jun. 21, 2016), <https://time.com/4372515/apple-app-developers-wwdc-sherlock-sherlocked/>; Adi Robertson, *Apple restores mail app after developer tries to rally ‘Sherlocked’ victims*, THE VERGE (Feb. 11, 2020), <https://www.theverge.com/2020/2/11/21133023/apple-bluemail-blix-restored-mac-app-store-sherlocking-patent-lawsuit>.

example, after a stress relief app called Breathe was Sherlocked in 2016, the app’s developers said that Apple used third-party developers “as an R&D arm.”<sup>2299</sup> *The Washington Post* reported on the phenomenon, explaining:

Developers have come to accept that, without warning, Apple can make their work obsolete by announcing a new app or feature that uses or incorporates their ideas. Some apps have simply buckled under the pressure, in some cases shutting down. They generally don’t sue Apple because of the difficulty and expense in fighting the tech giant—and the consequences they might face from being dependent on the platform.<sup>2300</sup>

At the Subcommittee’s fifth hearing, Representative Joe Neguse (D-CO) asked Ms. Daru of Tile about how Apple used competitively sensitive information it collects as owner of the iOS ecosystem to compete against third-party apps. She explained that as operating system provider and App Store operator, Apple knows who Tile’s customers are, the types of apps those customers preferred, and the demographics of iOS users that look at Tile’s app or search for similar apps—information that would give Apple a competitive advantage against Tile.<sup>2301</sup> Ms. Daru testified that Apple had harmed Tile’s service and user experience, while simultaneously introducing a rival app and preparing to launch a rival hardware product.<sup>2302</sup> Blix, developer of email management app BlueMail, has sued Apple in federal court claimed Apple has engaged in Sherlocking and infringed the patents underlying BlueMail:

Apple frequently takes other companies’ innovative features, adds those ideas to Apple’s own software products without permission, and then either ejects the original third-party application from the App Store (as it did with Blix’s software) or causes the third-party software developer to close its doors entirely.<sup>2303</sup>

In response to the requests for information, Match Group, Inc. told the Subcommittee that Apple has a history of “closely monitoring the success of apps in the App Store, only to copy the most successful of them and incorporate them in new iPhones” as a pre-installed app.<sup>2304</sup> Phillip Shoemaker, former director of app review for the App Store, similarly told Subcommittee staff that during his time

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<sup>2299</sup> John Patrick Pullen, *Why These People Are Upset About Apple’s Latest Updates*, TIME (Jun. 21, 2016), <https://time.com/4372515/apple-app-developers-wwdc-sherlock-sherlocked/>.

<sup>2300</sup> Reed Albergotti, *How Apple uses its App Store to copy the best ideas*, WASH POST. (Sept. 5, 2019), <https://www.washingtonpost.com/technology/2019/09/05/how-apple-uses-its-app-store-copy-best-ideas/>.

<sup>2301</sup> Competitors Hearing Transcript at 53 (statement of Kirsten Daru, Chief Privacy Officer & Gen. Counsel, Tile, Inc.).

<sup>2302</sup> See Competitors Hearing at 4 (statement of Kirsten Daru, Chief Privacy Officer & General Counsel, Tile, Inc.); Guilherme Rambo, *Apple revamping Find My Friends & Find My iPhone in unified app, developing Tile-like personal item tracking*, 9TO5MAC (Apr. 17, 2019), <https://9to5mac.com/2019/04/17/find-my-iphone-revamp/>.

<sup>2303</sup> Amended Complaint at 4, Dkt No. 13, Blix Inc. v. Apple Inc., No. 1:19-cv-1869-LPS (D. Del Dec. 20, 2019).

<sup>2304</sup> Submission from Source 736, to H. Comm. on the Judiciary, Source 736\_00000243 (Oct. 23, 2019) (on file with Comm.).

at Apple an app developer proposed an innovative way to wirelessly sync the iPhone and Mac.<sup>2305</sup> The app did not violate any of Apple's Guidelines, but it was rejected from the App Store nonetheless.<sup>2306</sup> Apple then appropriated the rejected app's feature for its own offerings.<sup>2307</sup>

During the Subcommittee's sixth hearing, Rep. Neguse asked Mr. Cook about Tile's testimony. In particular, he asked if Apple has access to the confidential information of app developers, and whether Apple's Developer Agreement explicitly authorizes Apple to use developers' information to build apps to compete against them.<sup>2308</sup> Mr. Cook's answer was non-responsive regarding allegations of Sherlocking. Instead, he said that Apple does not violate other companies' intellectual property rights.<sup>2309</sup>

In contrast, Apple co-founder and former CEO Steve Jobs once noted that “[w]e have always been shameless about stealing great ideas.”<sup>2310</sup> The Apple Developer Agreement, which Apple requires every app developer to agree to, appears to warns developers that in exchange for access to the App Store, Apple is free to build apps that “perform the same or similar functions as, or otherwise compete with” apps in the App Store.<sup>2311</sup> Additionally, “Apple will be free to use any information, suggestions or recommendations you provide to Apple pursuant to this Agreement for any purpose, subject to any applicable patents or copyrights.”<sup>2312</sup>

Mr. Cook's statement that Apple's apps play by the same rules as other apps appears contrary to Apple's stated policies. While the Apple Developer Agreement provides Apple the right to replicate third-party apps, Apple's Guidelines direct developers not to “copy another developer's work” and threaten removal of apps and expulsion from the Developer Program for those that do.<sup>2313</sup> Further, the Guidelines instruct developers to “[c]ome up with your own ideas,” and admonishes them “[d]on't simply copy the latest popular app on the App Store, or make some minor changes to another app's

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<sup>2305</sup> Interview with Phillip Shoemaker, former Senior Dir., App Store Review, Apple Inc. (Sept. 21, 2020).

<sup>2306</sup> *Id.*

<sup>2307</sup> *Id.*

<sup>2308</sup> CEO Hearing Transcript at 177 (question of Rep. Neguse (D-CO), Vice Chairman, Subcomm. on Antitrust, Commercial and Admin. Law).

<sup>2309</sup> *Id.* at 177–78 (statement of Tim Cook, CEO, Apple Inc.) (“[Apple] run[s] the App Store to help developers, not hurt them. We respect innovation. It's what our company was built on. We would never steal somebody's IP.”).

<sup>2310</sup> Reed Albergotti, *How Apple uses its App Store to copy the best ideas*, WASH POST. (Sept. 5, 2019), <https://www.washingtonpost.com/technology/2019/09/05/how-apple-uses-its-app-store-copy-best-ideas/>.

<sup>2311</sup> *Apple Developer Agreement, Clause 11: Apple Independent Development*, APPLE, <https://developer.apple.com/terms/apple-developer-agreement/Apple-Developer-Agreement-English.pdf>.

<sup>2312</sup> *Id.*

<sup>2313</sup> *App Store Review Guidelines: Introduction*, APPLE: DEVELOPER, <https://developer.apple.com/app-store/review/guidelines/> (last visited Sept. 27, 2020).

name or UI and pass it off as your own.”<sup>2314</sup> Lastly, Apple differentiates between—rather than conflates or confuses—copycat apps and intellectual property infringement, which are both prohibited in the App Store.<sup>2315</sup>

##### v. Excluding Rival Apps

During the Subcommittee’s sixth hearing, Representatives Val Demings (D-FL) and Lucy McBath (D-GA) asked questions regarding Apple’s conduct in 2018 and 2019 removing parental control apps from the App Store. In 2018, Apple announced its Screen Time app, a new feature bundled with iOS 12 that helped iOS users limit the time they and their children spent on the iPhone. Thereafter, Apple began to purge many of the leading rival parental control apps from the App Store. Apple explained the apps were removed because they used a technology called Mobile Device Management (MDM). The MDM technology allowed parents to remotely take over their children’s phones and block content. Apple noted that MDM could allow the app developer to access sensitive content on the device.<sup>2316</sup>

According to *The New York Times*, the parental control apps using MDM had been offered in the App Store for years, and hundreds of updates to those apps had been approved by Apple.<sup>2317</sup> As a result, many apps were forced to shut down,<sup>2318</sup> although some were given a reprieve.<sup>2319</sup> Two parental control apps filed a complaint with the European Commission, alleging Apple’s App Store policies were anticompetitive. The complaint alleged that as Apple purged competitors it introduced Screen

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<sup>2314</sup> *App Store Review Guidelines 4.1: Copycats*, APPLE: DEVELOPER, <https://developer.apple.com/app-store/review/guidelines/#copycats> (last visited Sept. 27, 2020).

<sup>2315</sup> *App Store Review Guidelines 4.1: Copycats*, 5.2: *Intellectual Property*, APPLE: DEVELOPER, <https://developer.apple.com/app-store/review/guidelines/> (last visited Sept. 27, 2020).

<sup>2316</sup> See Jack Nicas, *Apple Cracks Down on Apps that Fight iPhone Addiction*, N.Y. TIMES (Apr. 27, 2019), <https://www.nytimes.com/2019/04/27/technology/apple-screen-time-trackers.html>. See also Sarah Perez, *Apple puts third-party screen time apps on notice*, TECHCRUNCH (Dec. 5, 2018), <https://techcrunch.com/2018/12/05/apple-puts-third-party-screen-time-apps-on-notice/>.

<sup>2317</sup> Jack Nicas, *Apple Cracks Down on Apps that Fight iPhone Addiction*, N.Y. TIMES (Apr. 27, 2019), <https://www.nytimes.com/2019/04/27/technology/apple-screen-time-trackers.html>. See also Production of Apple, to H. Comm. on the Judiciary, HJC-APPLE-012255-59 (Apr. 28, 2019); HJC-APPLE-013251-53 (Apr. 28, 2019).

<sup>2318</sup> See e.g., Nick Kuh, *Mute App: Startup to Shutdown*, MEDIUM (Oct. 22, 2018), <https://medium.com/@nick.kuh/mute-app-startup-to-shutdown-a1db01440c56>; Georgie Powell, *In the Kill Zone – Update for Space on iOS*, SPACE (Nov. 6, 2018), <https://findyourphonelifebalance.com/news/2018/11/6/in-the-kill-zone-an-update-for-space-on-ios>; *Is Apple Systematically Destroying the Time Management Industry?*, KIDSLOX (Nov. 8, 2018), <https://kidslox.com/blog/apple-destroying-screen-time-industry/>; OurPact, *There Used to Be an App for That*, MEDIUM (May 1, 2019), <https://medium.com/@ourpactapp/there-used-to-be-an-app-for-that-41344f61fb6f>; Justin Payeur, *Letter to Users About Apple Parental Controls*, BOOMERANG (Jan. 31, 2020), <https://useboomerang.com/2020/01/31/letter-users-apple-parental-controls/>.

<sup>2319</sup> See Nick Kuh, *Apple Called...*, MEDIUM (Oct. 27, 2018), <https://medium.com/@nick.kuh/apple-called-a229d86ece30>; Georgie Powell, *Space is Back! An Update on our Discussions with Apple.*, SPACE (Nov. 7, 2018), <https://findyourphonelifebalance.com/news/2018/11/7/space-versus-apple>.

Time, pre-installed Screen Time on iOS 12 and activated it by default, and gave Screen Time access to iOS functionalities it denied to competing third-party apps.<sup>2320</sup>

Subcommittee staff reviewed emails from parents who contacted Apple to complain about the removal of one of the purged parental control apps.<sup>2321</sup> They said that Screen Time was a comparably worse option for consumers—and described it as “more complicated” and “less restrictive” than competitors.<sup>2322</sup> In emails to the company reviewed by Subcommittee staff, parents complained about Apple’s monopoly power over app distribution on iOS and self-interest in promoting Screen Time motivated Apple’s actions.<sup>2323</sup> In response, Apple Senior Vice President Worldwide Marketing, Phil Schiller explained that Screen Time was “designed to help parents manage their children’s access to technology.”<sup>2324</sup> He added that Apple would “work with developers to offer many great apps on the App Store for these uses, using technologies that are safe and private for us and our children.”<sup>2325</sup>

Internally, Apple’s Vice President of Marketing Communications, Tor Myhren concurred, responding “[t]his is quite incriminating. Is it true?” to an email with a link to *The New York Times*’ reporting.<sup>2326</sup> Apple’s communications team asked CEO Tim Cook to approve a “narrative” in that Apple’s clear-out of Screen Time’s rivals was “not about competition, this is about protecting kids privacy.”<sup>2327</sup>

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<sup>2320</sup> Press Release, Qustodio & Kidslox File a Complaint Against Apple with the European Commission over Abuse of Dominant Position, GLOBE NEWswire (Apr. 30, 2019), <https://www.globenewswire.com/news-release/2019/04/30/1812192/0/en/Qustodio-Kidslox-File-a-Complaint-Against-Apple-with-the-European-Commission-over-Abuse-of-Dominant-Position.html#>.

<sup>2321</sup> See e.g., Production of Apple, to H. Comm. on the Judiciary, HJC-APPLE-012242–43 (May 6, 2019) (on file with Comm.); HJC-APPLE-012245–46 (May 6, 2019); HJC-APPLE-012247–48 (June 5, 2019); HJC-APPLE-013220 (May 14, 2019); HJC-APPLE-013219 (May 5, 2019); HJC-APPLE-013251–53 (Apr. 28, 2019).

<sup>2322</sup> Jack Nicas, *Apple Cracks Down on Apps That Fight iPhone Addiction*, N.Y. TIMES (Apr. 27, 2019), <https://www.nytimes.com/2019/04/27/technology/apple-screen-time-trackers.html>.

<sup>2323</sup> See e.g., Production of Apple, to H. Comm. on the Judiciary, HJC-APPLE-013210–11 (Apr. 27, 2019) (on file with Comm.); HJC-APPLE-013215 (May 17, 2019); HJC-APPLE-013216 (May 6, 2019); HJC-APPLE-013221–23 (Apr. 29, 2019); HJC-APPLE-013265–66 (Apr. 27, 2019).

<sup>2324</sup> See e.g., *id.* at HJC-APPLE-013210–11 (Apr. 27, 2019) (on file with Comm.); HJC-APPLE-013217 (Apr. 27, 2019); HJC-APPLE-013221–23 (Apr. 29, 2019).

<sup>2325</sup> *Id.* at HJC-APPLE-013221–23 (Apr. 29, 2019).

<sup>2326</sup> *Id.* at HJC-APPLE-013175 (Apr. 27, 2019).

<sup>2327</sup> *Id.* at HJC-APPLE-012223 (June 2, 2019). See also CEO Hearing Transcript at 127 (statement of Tim Cook, CEO, Apple Inc.) (“It was that the use of technology called MDM, mobile device management, placed kids’ data at risk, and so we were worried about the safety of kids.”); CEO Hearing Transcript at 139 (statement of Tim Cook, CEO, Apple Inc.) (“We were concerned, Congresswoman, about the privacy and security of kids.”).

Developers of the purged apps also contacted Apple, outraged that they had been removed from the App Store while other apps that used MDM remained.<sup>2328</sup> One developer explained it had invested more than \$200,000 building its parental control app, then another \$30,000 to fix the problem Apple identified, only to be told that Apple would no longer support parental control apps in the App Store.<sup>2329</sup>

Although Apple claimed its conduct was motivated to protect privacy and not intended to clear out competitors to Screen Time, Apple reinstated many of the apps the same day that it was reported the Department of Justice was investigating Apple for potential antitrust violations.<sup>2330</sup> Apple’s solution to address privacy concerns was to ask the apps to promise not to sell or disclose user data to third parties, which could have been achieved through less restrictive means and without removing those apps from the App Store.<sup>2331</sup>

Developers of parental control apps asked Apple to “release a public API granting developers access to the same functionalities that Apple’s native ‘Screen Time’ uses.”<sup>2332</sup> Eventually, Apple did grant some apps access to APIs,<sup>2333</sup> but only after rival app developers were accused of being a risk to children’s privacy, removed from the App Store, forced to incur significant costs, only for Apple to change its mind.<sup>2334</sup> As one developer noted, Apple’s new MDM privacy policies resulted in “really nothing much changing from the developer side as far as the technology goes.”<sup>2335</sup>

Here, Apple’s monopoly power over app distribution enabled it to exclude rivals to the benefit of Screen Time. Apple could have achieved its claimed objective—protecting user privacy—through less restrictive means, which it ultimately did only after significant outcry from the public and a prolonged period of harm to rivals.<sup>2336</sup> Apple’s conduct here is a clear example of Apple’s use of

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<sup>2328</sup> See, e.g., Production of Apple, to H. Comm. on the Judiciary, HJC-APPLE-012255–59 (Apr. 28, 2019) (on file with Comm.); HJC-APPLE-012275–79 (Jan. 17, 2019); Production of Apple, to H. Comm. on the Judiciary, HJC-APPLE-012286–87 (Jan. 17, 2019).

<sup>2329</sup> *Id.* at HJC-APPLE-012286–87 (Jan. 17, 2019) (on file with Comm.).

<sup>2330</sup> Jack Nicas, *Apple Cracks Down on Apps that Fight iPhone Addiction*, N.Y. TIMES (Apr. 27, 2019), <https://www.nytimes.com/2019/04/27/technology/apple-screen-time-trackers.html>.

<sup>2331</sup> *Id.* See *App Store Review Guidelines 5.5: Mobile Device Management*, APPLE, <https://developer.apple.com/app-store/review/guidelines/#mobile-device-management> (last visited Sept. 27, 2020).

<sup>2332</sup> SCREEN TIME API, <https://screentimeapi.com/> (last visited Sept. 27, 2020).

<sup>2333</sup> See Joe Rossignol, *Apple Reverses Course and Allows Parental Control Apps to Use MDM Technology With Stricter Privacy Requirements*, MACRUMORS (Jun. 4, 2019), <https://www.macrumors.com/2019/06/04/apple-lets-parental-apps-use-mdm-strict-privacy/>.

<sup>2334</sup> See, e.g., Production of Apple, to H. Comm. on the Judiciary, HJC-APPLE-012275-79 (Jan. 17, 2019) (on file with the Comm.); HJC-APPLE-013210–11 (Apr. 27, 2019).

<sup>2335</sup> Production of Apple, to H. Comm. on the Judiciary, HJC-APPLE-012273–74 (June 4, 2019) (on file with Comm.).

<sup>2336</sup> See Damien Geradin & Dimitrios Katsifis, *The Antitrust Case Against the Apple App Store* 55–56 (Apr. 22, 2020), [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3583029](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3583029).

privacy as a sword to exclude rivals and a shield to insulate itself from charges of anticompetitive conduct.

Subcommittee staff learned that Apple has engaged in conduct to exclude rivals to benefit Apple's services in other instances. For example, Mr. Shoemaker explained that Apple's senior executives would find pretextual reasons to remove apps from the App Store, particularly when those apps competed with Apple services.<sup>2337</sup>

#### vi. Opaque Guidelines and Arbitrary Enforcement

At the Subcommittee's sixth hearing, Representative Henry C. "Hank" Johnson, Jr. (D-GA) asked Mr. Cook about how the App Store Developer Guidelines are interpreted and applied to developers in the App Store. Subcommittee Chairman Cicilline requested similar information about the Guidelines as well, including how they have evolved and whether there are "unwritten rules" developers must comply with.

The Guidelines are rules for the more than 20 million iOS app developers and more than 1.8 million apps in the App Store must comply with to reach "hundreds of millions of people around the world."<sup>2338</sup> Apple notes that the App Store is "highly curated" and that "every app is reviewed by experts."<sup>2339</sup> The introductory section of the Guidelines warns that Apple can create new rules at any time, and explains "[w]e will reject apps for any content or behavior that we believe is over the line. What line, you ask? Well as a Supreme Court Justice once said, 'I'll know it when I see it.' And we think that you will also know it when you cross it."<sup>2340</sup>

App developers the Subcommittee spoke with expressed frustration with Apple's curation of the App Store. David Heinemeier Hansson testified before the Subcommittee and explained:

It's complete tyranny, and the rules are often interpreted differently by different reviewers because they're intentionally left vague. So we live in constant fear we may have violated these vague rules, and that the next update to our applications will be blocked by Apple. There are countless examples where developers large and small have been denied access to publish their applications without explanation for days or even weeks at a time. It's insufferable.<sup>2341</sup>

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<sup>2337</sup> Interview with Phillip Shoemaker, former Senior Dir., App Store Review, Apple Inc. (Sept. 21, 2020).

<sup>2338</sup> *App Store Review Guidelines: Introduction*, APPLE: DEVELOPER, <https://developer.apple.com/app-store/review/guidelines/> (last visited Sept. 27, 2020).

<sup>2339</sup> *Id.*

<sup>2340</sup> *Id.*

<sup>2341</sup> Competitors Hearing at 9 (statement of David Heinemeier Hansson, Chief Technology Officer & Co-Founder, Basecamp).

One social media platform expressed concern that Apple has absolute discretion about whether to approve apps or accept updates.<sup>2342</sup> Developers are frustrated that Apple’s interpretation and enforcement of the Guidelines have changed over time, despite prior precedents and the fact developers rely on understanding the Guidelines to operate their businesses. One developer described Apple’s Guidelines as “arbitrarily interpreted,” and another party that called it “opaque and arbitrary.”<sup>2343</sup> Internally, after an app was rejected from the App Store an Apple employee wrote to the leadership of the App Store that Apple’s decision “still isn’t obvious to people inside the company that work directly on the App Store.”<sup>2344</sup>

In 2017, *Gizmodo* reported that iOS app maker Deucks saw its Finder for AirPods app removed from the App Store. The app used the iPhone’s Bluetooth signal to locate lost AirPods, helping its users find a missing earbud and save money by not having to purchase replacements. After the app was reviewed and approved, it disappeared from the App Store. Deucks told *Gizmodo* that Apple’s app review team “didn’t find anything wrong with the app itself, but rather they didn’t like the ‘concept’ of people finding their AirPods and hence [the app] was deemed ‘not appropriate for the App Store.’”<sup>2345</sup> At the time, Deucks had several other finder apps, such as Finder for Fitbit and Finder for Jawbone, that remained available in the App Store.<sup>2346</sup>

Developers also say that Apple uses its power over the App Store to change the Guidelines when convenient in ways that benefit Apple. The Guidelines—along with their interpretation and enforcement—all change over time in ways that always appear to benefit Apple.<sup>2347</sup> Spotify noted, “[t]he reality is Apple continues to move the goal posts and change the rules to its advantage and the detriment of developers,” and that the company’s “selective and capricious enforcement [of its App Store policies] is designed to put companies like [Spotify] at an untenable competitive disadvantage.”<sup>2348</sup> ProtonMail explained it offered a free version of its app in the App Store for years,

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<sup>2342</sup> Submission from Source 247, to H. Comm. on the Judiciary, Source 247\_0000000002 (Oct. 14, 2019) (on file with Comm.).

<sup>2343</sup> Submission from Source 736, to H. Comm. on the Judiciary, Source 736\_00000236 (Oct. 23, 2019) (on file with Comm.); Interview with Source 88 (May 12, 2020).

<sup>2344</sup> Production of Apple, to H. Comm. on the Judiciary, HJC-APPLE-014848 (May 30, 2018) (on file with Comm.).

<sup>2345</sup> Michael Nunez, ‘*Finder for AirPods’ App Mysteriously Disappears From App Store Without Much Explanation from Apple*, GIZMODO (Jan. 9, 2017), <https://gizmodo.com/finder-for-airpods-app-mysteriously-disappears-from-app-1790999059>.

<sup>2346</sup> *Id.*

<sup>2347</sup> See Dieter Bohn, *Apple’s App Store policies are bad, but its interpretation and enforcement are worse*, The VERGE (June 17, 2020), <https://www.theverge.com/2020/6/17/21293813/apple-app-store-policies-hey-30-percent-developers-the-trial-by-franz-kafka> (“The key thing to know is that the text of this policy is not actually the policy. Or rather, as with any law, the text is only *one* of the things you need to understand. You also need to know how it is *enforced* and how the enforcers *interpret* that text.”).

<sup>2348</sup> Kara Swisher, *Is It Finally Hammer Time for Apple and Its App Store*, N.Y. TIMES (June 19, 2020), <https://www.nytimes.com/2020/06/19/opinion/apple-app-store-hey.html?referringSource=articleShare>.

but then Apple abruptly changed the way it applied its IAP requirement and demanded the app add the ability for consumers to purchase upgraded functionality through the app—giving Apple a 30% cut from those subscriptions. ProtonMail noted that its app competes with an Apple service and that requiring it to implement IAP would increase its customer acquisition costs and make it less competitive, benefitting Apple.<sup>2349</sup> Another party Subcommittee staff spoke with said when Apple introduces a new app, developers with rival apps know they may be targeted for a violation of a rule Apple has suddenly decided to interpret or enforce differently.<sup>2350</sup> Another app developer that competes with an Apple service noted the Guidelines are constantly shifting, that Apple arbitrarily decides when an app no longer complies with the rules, and those decisions always favor Apple's interests.<sup>2351</sup>

Others have noted that Apple unilaterally determines if, how, and when to apply its Guidelines, and that it also freely makes up “unwritten rules” when convenient.<sup>2352</sup> For example, Apple’s distinction between “business” and “consumer” apps to justify its June 2020 decision to require Basecamp to redesign its app to permit in-app signups—and attempt to require implementation of IAP—was not a distinction that appeared in Apple’s Guidelines until an update on September 11, 2020.<sup>2353</sup> Apple said that it has a “set of standard terms for Amazon, and every other video-streaming service that met the criteria, to launch their service on Apple TV and iOS.”<sup>2354</sup> One of Apple’s business partners told Subcommittee staff that it suspects Amazon receives preferential treatment by being exempt from sharing revenue for some categories of transactions.<sup>2355</sup>

Subcommittee staff reviewed communications between Apple CEO Tim Cook and an executive from Baidu regarding whether Apple would provide Baidu with preferential treatment. At the Subcommittee’s sixth hearing, Rep. Johnson questioned Mr. Cook whether Apple differentiates in how it treats app developers. Rep. Johnson also asked if it was true that Apple assigned Baidu two employees to help it navigate the App Store bureaucracy, and whether other app developers receive the

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<sup>2349</sup> Submission from ProtonMail to H. Comm. on the Judiciary, 5 (Aug. 22, 2020) (on file with Comm.).

<sup>2350</sup> Interview with Source 88 (May 12, 2020).

<sup>2351</sup> Interview with Source 766 (July 2, 2020).

<sup>2352</sup> See JOHN BERGMAYER, PUBLIC KNOWLEDGE, TENDING THE GARDEN: HOW TO ENSURE THAT APP STORES PUT USERS FIRST 27 (2020), [https://www.publicknowledge.org/wp-content/uploads/2020/06/Tending\\_the\\_Garden.pdf](https://www.publicknowledge.org/wp-content/uploads/2020/06/Tending_the_Garden.pdf); Bapu Kotapati, et al., *The Antitrust Case Against Apple*, YALE UNIV., THURMOND ARNOLD PROJECT, DIGITAL PLATFORM THEORIES OF HARM PAPER SERIES: PAPER 2, 22 (2020), <https://som.yale.edu/sites/default/files/DTH-Apple-new.pdf>.

<sup>2353</sup> See Ben Thompson, *Xscale and ARM in the Cloud, Hey Versus Apple, Apple’s IAP Campaign*, STRATECHERY (Jun. 17, 2020) <https://stratechery.com/2020/xscale-and-arm-in-the-cloud-hey-versus-apple-apples-iap-campaign/>; John Gruber, *The Flimsiness of ‘Business vs. Consumer’ as a Justification for Apple’s Rejection of Hey From the App Store for Not Using In-App Purchases*, DARING FIREBALL (June 16, 2020), [https://daringfireball.net/2020/06/hey\\_app\\_store\\_rejection\\_flimsiness](https://daringfireball.net/2020/06/hey_app_store_rejection_flimsiness); Sarah Perez & Anthony Ha, *Apple revises App Store Rules to permit game streaming apps, clarify in-app purchases and more*, TECHCRUNCH (Sept. 11, 2020), <https://techcrunch.com/2020/09/11/apple-revises-app-store-rules-to-permit-game-streaming-apps-clarify-in-app-purchases-and-more/>.

<sup>2354</sup> CEO Hearing Transcript at 8 (response to Questions for the Record of Tim Cook, CEO, Apple Inc.).

<sup>2355</sup> Interview with Source 77 (Sept. 10, 2020).

same access to Apple personnel. Mr. Cook responded, “we treat every developer the same,” and explained the App Store Guidelines “apply evenly to everyone.”<sup>2356</sup> He also said “I don’t know about that, sir,” in response to Mr. Johnson’s inquiry about Baidu, adding, “We do a lot of things with developers including looking at their beta test apps regardless of whether they’re large or small.”<sup>2357</sup>

Communications reviewed by Subcommittee staff show that in 2014 Baidu requested, among other things, that Apple “set up a fast track for the review process for Baidu APPs,” along with setting Baidu as the default search and mapping services on “all Apple devices in China.”<sup>2358</sup> Mr. Cook solicited feedback from Apple’s senior executives regarding these and other requests from Baidu, and also noting, “I think we should have someone focus on them as we have done with Facebook. Thoughts?”<sup>2359</sup> Responding to the email thread with Mr. Cook’s request that Apple focus on Baidu as it had with Facebook, one executive explained, “Engineering proposal is for extensions to be our path for integration,” and responded to Baidu’s app review fast track request, “I believe we put a lot of work into having a fast review process for all apps.”<sup>2360</sup>

Within two weeks, Mr. Cook responded to the Baidu executive’s requests. “I’d like Apple to have a deeper relationship with Baidu,” Cook wrote, noting that “some of” the Baidu executive’s requests were “great starts.”<sup>2361</sup> In response to the Baidu executive’s request for “APP Review Fast Track,” Mr. Cook wrote “We can set up a process where Baidu could send us a beta app for review and this can often speed up the process.”<sup>2362</sup> Mr. Cook then noted he had assigned Baidu two employees from App Store chief Phil Schiller’s team to “help manage through Apple.”<sup>2363</sup>

When asked about these issues in questions submitted for the record following the hearing, Mr. Cook explained his view that “There is no ‘fast track’ for App Review special to Baidu,” that “any developer can request expedited review from App Review by submitting a formal expedite request,” and “[t]he beta app review process I referenced in my email has been available to developers since 2009.”<sup>2364</sup> Mr. Cook also noted “The key contacts referenced in my email were focused on other strategic opportunities outlined by Baidu. Neither individual had responsibility for App Store review.”<sup>2365</sup>

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<sup>2356</sup> CEO Hearing Transcript at 51 (statement of Tim Cook, CEO, Apple Inc.).

<sup>2357</sup> *Id.*

<sup>2358</sup> Production of Apple, to H. Comm. on the Judiciary, HJC-APPLE-011082 (June 3, 2015) (on file with Comm.).

<sup>2359</sup> *Id.* at HJC-APPLE-011081 (Aug. 3, 2014).

<sup>2360</sup> *Id.* at HJC-APPLE-011079-80 (Aug. 3, 2014).

<sup>2361</sup> *Id.* at HJC-APPLE-011083 (June 3, 2015).

<sup>2362</sup> *Id.* at HJC-APPLE-011084 (June 3, 2015).

<sup>2363</sup> *Id.*

<sup>2364</sup> CEO Hearing Transcript at 8 (response to Questions for the Record of Tim Cook, CEO, Apple Inc.).

<sup>2365</sup> *Id.* at 9.

In a subsequent interview with Mr. Shoemaker, the former Director of App Review for the App Store, Subcommittee staff asked about Apple’s treatment of app developers. Mr. Shoemaker responded that Apple “was not being honest” when it claims it treats every developer the same.<sup>2366</sup> Mr. Shoemaker has also written that the App Store rules were often “arbitrary” and “arguable,” and that “Apple has struggled with using the App Store as a weapon against competitors.”<sup>2367</sup> He has noted that “Apple has complete and unprecedented power over their customers’ devices. The decisions they make with regards to third-party apps needs to be above reproach, and currently are not.”<sup>2368</sup>

Mr. Shoemaker also admitted that Apple advantages its own apps over third-party apps. In an interview with Subcommittee staff, he described it as inaccurate to say Apple does not favor its own apps over third-party apps.<sup>2369</sup> He has previously noted that apps that compete against Apple’s services have a track record of problems getting through the App Store’s review process. For example, Apple’s gaming service, Apple Arcade, is a type of app that was “consistently disallowed from the store,” when offered by third-party developers, but Apple allowed its own app in the store “even though it violates existing [App Store] guidelines.”<sup>2370</sup> Mr. Shoemaker explained to Subcommittee staff that Apple’s new Guideline 3.1.2a related to streaming game services was likely written to “specifically exclude Google Stadia,” describing the decision as “completely arbitrary.”<sup>2371</sup> Similar conduct has been commented on by the courts,<sup>2372</sup> as well as international antitrust authorities.<sup>2373</sup>

Apple disputes that its rules are opaque and arbitrarily applied. In response to questions from Rep. Johnson, Mr. Cook insisted the Guidelines are “open and transparent,” and that Apple “treat[s] every developer the same.”<sup>2374</sup> In response to questions submitted for the record from Subcommittee Chairman Cicilline (D-RI), Mr. Cook reiterated that “[t]he Guidelines provide transparency and act as

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<sup>2366</sup> Interview with Phillip Shoemaker, former Senior Dir., App Store Review, Apple Inc. (Sept. 21, 2020).

<sup>2367</sup> Phillip Shoemaker, *A Modern Content Store*, MEDIUM (Dec. 12, 2017), <https://medium.com/@phillipshoemaker/a-modern-content-store-3344bbe79edc>.

<sup>2368</sup> Phillip Shoemaker, *Apple v. Everybody*, MEDIUM (Mar. 29, 2019), <https://medium.com/@phillipshoemaker/apple-v-everybody-5903039e3be>.

<sup>2369</sup> Interview with Phillip Shoemaker, former Senior Dir., App Store Review, Apple Inc. (Sept. 21, 2020).

<sup>2370</sup> Phillip Shoemaker, *Apple v. Everybody*, MEDIUM (Mar. 29, 2019), <https://medium.com/@phillipshoemaker/apple-v-everybody-5903039e3be>.

<sup>2371</sup> Interview with Phillip Shoemaker, former Senior Dir., App Store Review, Apple Inc. (Sept. 21, 2020).

<sup>2372</sup> U.S. v. Apple Inc., 952 F. Supp. 2d 638, 662 (S.D.N.Y. 2013), *aff’d* 791 F.3d 290 (2d Cir. 2015).

<sup>2373</sup> See e.g., Neth. Auth. for Consumers & Mkts. Study at 5–6, 68, 79; Killian Bell, *Apple Rejects Samsung Pay app for iOS*, CULT OF MAC (Dec. 12, 2016), <https://www.cultofmac.com/457916/apple-rejects-samsung-pay-app-ios/>; Gil Jaeshik & Park Sora, *Apple Rejects Samsung Pay Mini to Be Registered on Its App Store*, KOREA IT NEWS (Dec. 12, 2016), <http://english.etnews.com/2016121220003>.

<sup>2374</sup> CEO Hearing Transcript at 61 (statement of Tim Cook, CEO, Apple Inc.).

a practical guide to help developers better understand the app approval process. . . . Apple attempts to apply the Guidelines uniformly to all developers and all types of apps.”<sup>2375</sup>

Apple appears to have recently revised some of its App Store policies under the scrutiny of the Subcommittee, the Department of Justice, and global competition authorities. In June 2020, Apple announced new policies for its App Store review that will allow app developers to appeal decisions by app reviewers and even challenge the Guidelines governing the App Store. Apple also announced that app updates with bug fixes will no longer be held up due to a violation of an App Store guideline. Additionally, on September 11, 2020 Apple changed its App Developer Guidelines to address some of the questions raised about the Guidelines arising from many recent controversies described earlier in this Report.<sup>2376</sup>

### 3. Siri Intelligent Voice Assistant

#### a. Market Power

Apple describes Siri as “an intelligent assistant that offers a faster, easier way to get things done on Apple devices,” helping users to “make calls, send text messages or email, schedule meetings and reminders, make notes, search the Internet, find local businesses, get directions, get answers, find facts, and more just by asking.”<sup>2377</sup> Apple integrated Siri into iPhone 4S at its release in October 2011. As of January 2018, Apple said Siri was active on over 500 million devices, making Siri one of the most widely used voice assistants in the world.<sup>2378</sup>

In a submission to the Subcommittee, Apple states that it neither creates market share data for Siri nor tracks third-party market share data for integrated voice assistants.<sup>2379</sup> Market research firm FutureSource Consulting found that as of December 2019 Siri was the leading intelligent virtual assistant with a 35% market share globally.<sup>2380</sup> A third-party supplied the Subcommittee with additional market research that reported in the first half of 2018 Apple’s Siri was built into 42% of virtual assistant-enabled devices sold worldwide.<sup>2381</sup> Apple, along with Google, Amazon, and

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<sup>2375</sup> CEO Hearing Transcript at 5 (response to Questions for the Record of Tim Cook, CEO, Apple Inc.).

<sup>2376</sup> See Sarah Perez and Anthony Ha, *Apple Revises App Store Rules to permit game streaming apps, clarify in-app purchases and more*, TECHCRUNCH (Sept. 11, 2020), <https://techcrunch.com/2020/09/11/apple-revises-app-store-rules-to-permit-game-streaming-apps-clarify-in-app-purchases-and-more/>.

<sup>2377</sup> Production of Apple, to H. Comm. on the Judiciary, HJC-APPLE-000007 (Oct. 14, 2019) (on file with Comm.).

<sup>2378</sup> Press Release, Apple, HomePod arrives February 9, available to order this Friday (Jan. 13, 2018), <https://www.apple.com/newsroom/2018/01/homepod-arrives-february-9-available-to-order-this-friday/>.

<sup>2379</sup> Production of Apple, to H. Comm. on the Judiciary, HJC-APPLE-000011 (Oct. 14, 2019) (on file with Comm.).

<sup>2380</sup> Press Release, FutureSource Consulting, Virtual Assistants to Exceed 2.5 Billion Shipments in 2023 (Dec. 18, 2019), <https://www.futuresource-consulting.com/press-release/consumer-electronics-press/virtual-assistants-to-exceed-25-billion-shipments-in-2023/>.

<sup>2381</sup> Submission from Source 918, to H. Comm. on the Judiciary, Source 918-0001578 (Nov. 4, 2019) (on file with Comm.).

Microsoft are the leading providers of intelligent virtual assistants.<sup>2382</sup> Siri's success reflects its integration into the iPhone and other Apple hardware, such as the iPad, Mac, Apple Watch, Apple TV, and HomePod.<sup>2383</sup> Siri is the hub of Apple's ecosystem of smart-home devices. Users can control Apple HomeKit-compatible devices using Siri on an Apple device.<sup>2384</sup>

b. Merger Activity

The startup Siri, Inc launched the Siri app for iOS in February 2010 based on a prototype developed by Adam Cheyer while working at SRI International research lab.<sup>2385</sup> Apple acquired the company two months later.<sup>2386</sup> Apple has followed up on its acquisition of Siri with a series of additional acquisitions to strengthen Siri's underlying technology and natural language processing. For example, in 2019, Apple acquired Laserlike, technology to help Siri improve at delivering personalized results for users.<sup>2387</sup> In 2020, Apple acquired Inductiv, an AI technology for correcting data flaws, Xnor.ai which specializes in low-power, edge-based artificial-intelligence tools needed for smart home devices, and Voysis to increase Siri's speech recognition accuracy.<sup>2388</sup>

c. Conduct

As with many of Apple's other products and services, Apple has taken a walled garden approach to the intelligent voice assistant market by, among other things, limiting interoperability by restricting how digital voice assistants work on Apple devices and how Siri works with non-Apple devices, and by using Siri to guide users to its own products and services.

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<sup>2382</sup> See e.g., Press Release, FutureSource Consulting, Virtual Assistants to Exceed 2.5 Billion Shipments in 2023 (Dec. 18, 2019), <https://www.futuresource-consulting.com/press-release/consumer-electronics-press/virtual-assistants-to-exceed-25-billion-shipments-in-2023/>; Submission from Source 918, to H. Comm. on the Judiciary, Source 918-0001578 (Nov. 4, 2019) (on file with Comm.).

<sup>2383</sup> See Press Release, FutureSource Consulting, Virtual Assistants to Exceed 2.5 Billion Shipments in 2023 (Dec. 18, 2019), <https://www.futuresource-consulting.com/press-release/consumer-electronics-press/virtual-assistants-to-exceed-25-billion-shipments-in-2023/>; Juli Clover, *Siri: Everything You Need to Know*, MAC RUMORS (July 27, 2020), <https://www.macrumors.com/guide/siri/>.

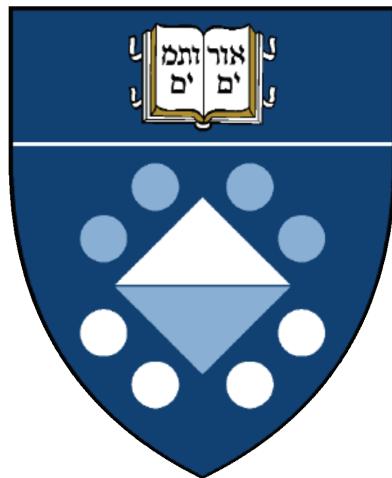
<sup>2384</sup> Daniel Wroclawski, *How to Use Siri and Apple HomeKit to Control Your Smart Home*, CONSUMER REPS. (Oct. 5, 2019), <https://www.consumerreports.org/home-automation-systems/how-to-use-siri-to-control-smart-home/>.

<sup>2385</sup> Catherine Clifford, *Here's how Siri made it onto your iPhone*, CNBC (Jun. 29, 2017), <https://www.cnbc.com/2017/06/29/how-siri-got-on-the-iphone.html>.

<sup>2386</sup> Jenna Wortham, *Apple Buys a Start-Up for Its Voice Technology*, N.Y. TIMES (Apr. 29, 2010), <https://www.nytimes.com/2010/04/29/technology/29apple.html>.

<sup>2387</sup> Jeremy Horwitz, *Apple acquires Laserlike, an ML startup that might make Siri smarter*, VENTURE BEAT (Mar. 13, 2019), <https://venturebeat.com/2019/03/13/apple-bought-laserlike-an-ml-startup-that-might-make-siri-smarter/>.

<sup>2388</sup> See Lisa Eadicicco, *Apple just bought another AI startup to help Siri catch up to rivals Amazon and Google*, BUS. INSIDER (May 28, 2020), <https://www.businessinsider.com/apple-buys-ai-startup-inductiv-siri-catch-up-amazon-google-2020-5>; Mark Gurman, *Apple Acquires AI Startup to Better Understand Natural Language*, BLOOMBERG (Apr. 3, 2020), <https://www.bloomberg.com/news/articles/2020-04-03/apple-acquires-ai-startup-to-better-understand-natural-language>; Charlie Wood, *Apple has acquired the artificial-intelligence startup Xnor.ai for a reported \$200 million*, BUS. INSIDER (Jan. 16, 2020), <https://www.businessinsider.com/apple-reportedly-buys-xnor-ai-200-million-2020-1>.



# Yale University

## *Thurman Arnold Project*

Digital Platform Theories of Harm  
*Paper Series: Paper 2*

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### The Antitrust Case Against Apple

May 2020

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\* Parts of this report are derived from a forthcoming paper at the Berkeley Technology Law Journal. See Shili Shao, *Antitrust in the Consumer Platform Economy: How Apple Has Abused Its Mobile Platform Dominance*, 36 BERKELEY TECH. L.J. (forthcoming 2021).

## INTRODUCTION

**Overview.** The App Store hosts over two million apps,<sup>1</sup> 20 million registered developers,<sup>2</sup> and nearly half of American smartphone users, who download eight billion apps<sup>3</sup> and generate over \$20 billion in sales each quarter.<sup>4</sup> As Apple describes, these apps have “ignited a cultural, social and economic phenomenon that changed how people work, play, meet, travel and so much more.”<sup>5</sup> Apple’s anticompetitive conduct, however, threatens to thwart competition in this vibrant market.

The Apple ecosystem’s dominant revenue share, lock-in effects, and consumer myopia give the iPhone maker monopoly power as a mobile platform: Apple holds 71% of the mobile platform market by revenue; iPhone users’ switching costs are 50 times higher than a 5% app price increase; and Apple has been able to raise iPhone prices by 33% without losing sales.<sup>6</sup>

Robust competition between platforms is particularly elusive in the mobile-app space. The current players, Apple and Android, have chosen to compete on different dimensions. Apple uniquely emphasizes privacy, security, and user experience,<sup>7</sup> while Google offers lower prices at

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<sup>1</sup> Jack Nicas & Keith Collins, *How Apple’s Apps Topped Rivals in the App Store It Controls*, N.Y. TIMES (Sept. 9, 2019), <https://www.nytimes.com/interactive/2019/09/09/technology/apple-app-store-competition.html>.

<sup>2</sup> Ingrid Lunden, *App Store Hits 20M Registered Developers and \$100B in Revenues, 500M Visitors per Week*, TECHCRUNCH (June 4, 2018, 1:20 PM EST), <https://techcrunch.com/2018/06/04/app-store-hits-20m-registered-developers-at-100b-in-revenues-500m-visitors-per-week>.

<sup>3</sup> Evan Niu, *As Usual, Apple’s App Store Revenue Leads Google Play in Third Quarter*, MOTLEY FOOL (Oct. 11, 2019, 10:00 AM), <https://www.fool.com/investing/2019/10/11/as-usual-apples-app-store-revenue-leads-google-pla.aspx>.

<sup>4</sup> Kif Leswing, *Apple’s App Store Had Gross Sales Around \$50 Billion Last Year, But Growth Is Slowing*, CNBC (Jan. 8, 2020, 6:01 AM EST), <https://www.cnbc.com/2020/01/07/apple-app-store-had-estimated-gross-sales-of-50-billion-in-2019.html>.

<sup>5</sup> Newsroom, *The App Store Turns 10*, APPLE (July 5, 2018), <https://www.apple.com/newsroom/2018/07/app-store-turns-10>.

<sup>6</sup> See *infra* Section I.a & text accompanying notes 18-21.

<sup>7</sup> See Peter Kafka, *Tim Cook Says Facebook Should Have Regulated Itself, But It’s Too Late for That Now*, VOX (Mar. 28, 2018, 12:15 PM EST), <https://www.vox.com/2018/3/28/17172212/apple-facebook-revolution-tim-cook-interview-privacy-data-mark-zuckerberg>.

the expense of monetizing user attention.<sup>8</sup> The differentiation reduces head-to-head competition between platforms and exacerbates lock-in effects. Further, any newcomers to the market would face significant entry barriers. To offer a new mobile-app platform, an entrant must corral enough developers to write apps for its systems and enough consumers to entice those developers in the first place. Entrants also lack Apple and Google's inherent ability to integrate their app stores with their operating systems and corresponding ability to leverage a large installed base of users.<sup>9</sup>

**Competitive harms.** Apple has abused its market power to tie the distribution of digital goods to its proprietary in-app purchase system to impose a 30% tax and extract supracompetitive profits, leading to higher app prices and reduced innovation. Moreover, Apple has excluded rivals and favored its own apps by downgrading competitors' discovery and promotions, blocking certain rivals entirely (e.g., in the NFC payment market), and limiting others' access to key APIs, in some cases right after copying their apps. In conjunction with the discriminatory application of the 30% tax, Apple's conduct towards major multi-homing apps such as Spotify reduces cross-platform competition with Android and impedes the rise of future platforms reminiscent of Microsoft's exclusion of Netscape to preserve its Windows monopoly.

Apple has been seeking to diversify its business model<sup>10</sup> and has launched video-streaming, news, and video-game subscription services and piloted its own credit card, music, podcast, and

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<sup>8</sup> NETH. AUTH. FOR CONSUMERS & MKTS., MARKET STUDY INTO MOBILE APP Stores 83 (Apr. 11, 2019), <https://www.acm.nl/sites/default/files/documents/market-study-into-mobile-app-stores.pdf> [hereinafter Dutch ACM Study].

<sup>9</sup> While also developing an operating system is possible in theory, it entails the additional task of courting device manufacturers and competing against Google, which offers the Android operating system for free to device manufacturers. See *Android Is for Everyone*, ANDROID, <https://www.android.com/everyone>.

<sup>10</sup> Maribel Lopez, *Evaluating Apple's Services Strategy Ahead of the Apple Watch 5 Release*, FORBES (Sept. 7, 2019), <https://www.forbes.com/sites/maribellopez/2019/09/07/evaluating-apples-services-strategy-aheadof-the-apple-watch-5-release>.

health-tracking apps.<sup>11</sup> As Apple aggressively pushes into services and engages in self-preferencing conduct, apps in these categories increasingly face the risk of distorted competition.

Apple claims business justifications such as security, app discovery/promotion, and quality control. But they are either pretextual or unnecessarily restrictive, lacking a causal relationship to Apple's anticompetitive restrictions or are achievable by giving consumers choice.

In this report, we explore potential antitrust claims against Apple—namely tying, essential facilities, refusal to deal, and monopoly leveraging.

## I. MARKET POWER

Apple holds strong market power as a mobile app platform, which is required for both illegal tying and monopolization.<sup>12</sup>

### a. Indirect Evidence

***App Store as a distinct market.*** The App Store should be treated as its own distinct market. Though other app platforms exist—with Google's Play Store being the only even arguable comparator—none are reasonable alternatives to Apple's platform. For the more than 100 million iPhone owners in the United States,<sup>13</sup> the App Store is the sole way of discovering and downloading mobile apps. This is because the iPhone, iOS, and App Store are inextricably combined: buying an iPhone commits users to using the App Store and nothing but the App Store.

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<sup>11</sup> Julian Chokkattu, *Email App Maker Begs Apple CEO to Get Back on the App Store*, WIRED (Nov. 22, 2019, 1:23 PM), <https://www.wired.com/story/bluemail-developers-write-open-letter-to-apple-mac-app-store>; Newsroom, *Apple Services Now Available in More Countries Around the World*, APPLE (Apr. 21, 2020), <https://www.apple.com/newsroom/2020/04/apple-services-now-available-in-more-countries-around-the-world>.

<sup>12</sup> See *Illinois Tool Works v. Independent Ink*, 547 U.S. 28, 46 (2006); *United States v. Grinnell Corp.*, 384 U.S. 563, 570-71 (1966).

<sup>13</sup> *Apple Grows iPhone Share in U.S., Despite Overseas Challenge*, eMARKETER (Mar. 12, 2019), <https://www.emarketer.com/content/apple-grows-iphone-share-in-us-despite-overseas-challenge>.

Hence roughly half of smartphone users are “locked-in” to the App Store unless they choose to purchase a new, non-Apple phone.

Several factors impede consumers who seek to switch away from the iPhone. New phones are expensive, costing at least several hundred dollars to over \$1000 for flagship models. As a result, consumers typically hold onto their smartphones for extended periods, on average 24.7 months before upgrading.<sup>14</sup> This ownership longevity is due in part to the high cost of smartphones and to carrier payment plans that allow consumers to pay for phones in monthly installments spread over 18-30 months.<sup>15</sup>

Beyond these tangible costs, many consumers will not want to switch in the first place for reasons unrelated to their App Store experience. For one, Apple has created a walled garden of products. Many consumers own an iPhone and also an iPad, Apple Watch, or MacBook. For these consumers, switching means giving up benefits like the ability to work on a different device and pick up exactly where you left off on another, take phone calls from your computer, forward text messages, and seamlessly transfer content.<sup>16</sup> Consumers also face additional non-monetary costs of switching—they may, for instance, lose their contacts and valued personal data when changing phones.<sup>17</sup>

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<sup>14</sup> See Abigail Ng, *Smartphone Users Are Waiting Longer Before Upgrading—Here’s Why*, CNBC (May 17, 2019), <https://www.cnbc.com/2019/05/17/smartphone-users-are-waiting-longer-before-upgrading-heres-why.html> (citing Kantar Worldpanel study).

<sup>15</sup> See Ella Wagner, *Getting a New Phone: Installments, Leasing, and Early Upgrades*, WHISTLEOUT (Mar. 22, 2019), <https://www.whistleout.com/CellPhones/Guides/a-guide-to-phone-payment-plans>.

<sup>16</sup> See *Use Continuity to Connect Your Mac, iPhone, iPad, iPod Touch, and Apple Watch*, APPLE, <https://support.apple.com/en-us/HT204681>. Developing these synergies has long been part of Apple’s plan to keep consumers in its orbit. Steve Jobs himself strategized in 2011 that the company should “[t]ie all of our products together, so we further lock customers into our ecosystem.” See Don Reisinger, *Steve Jobs Wanted to ‘Further Lock Customers’ into Apple’s ‘Ecosystem,’* CNET (Apr. 2, 2014, 7:13 AM PST), <https://www.cnet.com/news/steve-jobs-wanted-to-further-lock-customers-into-apples-ecosystem>.

<sup>17</sup> Personal data includes the panoply of applications and settings within those applications users have already set up on their device. Cf. Fiona Scott Morton et al., *Committee for the Study of Digital Platforms Market Structure and Antitrust Subcommittee Report*, GEORGE J. STIGLER CTR. FOR STUDY ECON. & ST. 84 (2019), <https://research.chicagobooth.edu/-/media/research/stigler/pdfs/market-structure-report.pdf> (describing switching costs generally)

In quantitative terms, researchers have found the cost of switching smartphone OS is around \$250 solely from “application purchasing cost, accessory purchasing cost, and uncertainty from the possibility of additional post-transition payment increase,” which excludes the additional costs of losing compatibility with other platform-specific smart devices.<sup>18</sup> This means that if iPhone apps see a 5% price increase—a “Small Significant Non-transitory Increase in Price” (SSNIP)<sup>19</sup>—amounting to \$5 per user given average annual app spending of \$100,<sup>20</sup> users would likely tolerate the price hike as switching costs would be over 50 times higher. The aforementioned factors are reflected in Apple’s 90% customer retention of iPhone users.<sup>21</sup> Put simply, Apple has an enduring hold over nearly 50% of U.S. smartphone users.

Defining the App Store as its own market is analogous to *Kodak*,<sup>22</sup> where the Court allowed a market definition limited to Kodak printers to proceed to summary judgment. In both cases, customers were locked in, and sellers could profitably “maintain supracompetitive prices in the aftermarket because the switching costs are high relative to the increase in service prices.”<sup>23</sup> In *Kodak*, the company presented a defense that sophisticated business buyers were unencumbered by its strategy of pricing printers low and services high because they could assess “lifecycle price.”<sup>24</sup> Here, Apple’s retail consumers display no hallmarks of sophistication. If anything, they

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<sup>18</sup> See Yuri Park & Yoonmo Koo, *An Empirical Analysis of Switching Costs in the Smartphone Market in South Korea*, 40 TELECOMM. POL’Y 307, 313-14 (2016). The dollar value is based on the exchange rate of 1 South Korean won to 0.00081 USD on April 24, 2020.

<sup>19</sup> See U.S. DEP’T OF JUST. & FED. TRADE COMM’N, HORIZONTAL MERGER GUIDELINES §§ 4.1.1-2 (2010), <https://www.ftc.gov/sites/default/files/attachments/merger-review/100819hmg.pdf>.

<sup>20</sup> See Randy Nelson, *U.S. iPhone Users Spent an Average of \$100 on Apps in 2019, Up 27% from 2018*, SENSOR TOWER (Mar. 25, 2020), <https://sensortower.com/blog/revenue-per-iphone-2019>.

<sup>21</sup> *Mobile Operating System Loyalty: High and Steady*, CIRP (Mar. 21, 2018), <https://www.cirpllc.com/blog/2018/3/21/mobile-operating-system-loyalty-high-and-steady>.

<sup>22</sup> Eastman Kodak Co. v. Image Tech. Servs., Inc., 504 U.S. 451 (1992).

<sup>23</sup> *Id.* at 476. The analog to service prices in the App Store’s case is an App Store experience degraded by higher prices and lower quality of offerings.

<sup>24</sup> *Id.*

are more susceptible to the behavioral bias of hyperbolic discounting that minimizes future costs.<sup>25</sup>

More generally, the danger of increasing costs to captive consumers in the App-Store aftermarket becomes increasingly cognizable as Apple pivots to a services-focused strategy.<sup>26</sup>

**Market share.** The App Store should still have market power if the market were defined to include all mobile apps, including those available on Android. Apple has 71% of the U.S. mobile app market by revenue.<sup>27</sup> Its high and durable market share internationally—over 60% over the past 5 years—corroborates its market power in the United States.<sup>28</sup> Courts have found a market share higher than 70% in a market with substantial entry barriers sufficient for monopoly power<sup>29</sup> and 59% and 69% to be sufficient for tying.<sup>30</sup> Apple’s market share alone is thus likely to show market power.

b. Direct Evidence

Evidence of Apple’s market power over the mobile-app market can be gleaned from direct evidence of Apple exercising control over prices or excluding competitors.<sup>31</sup> Despite raising iPhone’s prices by around 33% over the past few years, Apple continues to hold strong control over customers and the iPhone’s unit sales volume has remained steady.<sup>32</sup> Further, the company

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<sup>25</sup> See Shili Shao, Antitrust in the Consumer Platform Economy, Part II (May 11, 2020) (manuscript).

<sup>26</sup> See *supra* Introduction.

<sup>27</sup> Reed Albergotti, *How Apple Uses its App Store to Copy the Best Ideas*, WASH. POST (Sept. 5, 2019), <https://www.washingtonpost.com/technology/2019/09/05/how-apple-uses-its-app-store-copy-best-ideas>.

<sup>28</sup> See Figure 2. STATISTA, *Global Mobile App Sales Revenue Distribution* (June 2019), <https://www.statista.com/statistics/259510/revenue-distribution-between-the-apple-app-store-and-google-play>.

<sup>29</sup> See, e.g., *Exxon Corp. v. Berwick Bay Real Estate Partners*, 748 F.2d 937, 940 (5th Cir. 1984) (“[M]onopolization is rarely found when the defendant’s share of the relevant market is below 70%.”).

<sup>30</sup> See *Dickson v. Microsoft Corp.*, 309 F.3d 193, 210 n.20 (4th Cir. 2002); *Bodet v. Charter Commc’ns*, 2010 U.S. Dist. LEXIS 87088, at \*17-19 (E.D. La. 2010); *In re Cox Enters. Set-Top Cable Television Box Antitrust Litig.*, 2010 U.S. Dist. LEXIS 58417, at \*19-20 (W.D. Okla. 2010).

<sup>31</sup> See *Eastman Kodak Co. v. Image Tech. Servs., Inc.*, 504 U.S. 451, 477-78 (1992) (“It is clearly reasonable to infer that Kodak has market power to raise prices and drive out competition . . . [from] direct evidence that Kodak did so”).

<sup>32</sup> See Figure 3. Evan Niu, *The Great Irony of Apple’s iPhone Price Increases*, MOTLEY FOOL (Dec. 6, 2018), <https://www.fool.com/investing/2018/12/06/the-great-irony-of-apples-iphone-price-increases.aspx>. An alternative but less convincing explanation of iPhone’s price increases is that quality improvement drives increased customer demand, as peer industry players’ profits took a nosedive after following Apple’s price hikes. For example,

has purposely deprecated its technology, likely to spur its users to buy new phones.<sup>33</sup> There is also testimony from developers that they cannot compete without being on the App Store. As the CEO of Basecamp testified before Congress, “[I]t’s essentially suicide not to have a presence on the iPhone.”<sup>34</sup>

Apple’s ability to tie its supraregulatory 30% IAP processing fee to App Store transactions offers further direct evidence of its market power. The Seventh Circuit has held that “[t]he best way to show power over price is to establish directly that the price of the tied package is higher than the price of components sold in competitive markets.”<sup>35</sup> Certain Android apps (e.g., ebooks and downloaded music) can be distributed through the Google Play Store and use their own in-app purchase services without having to pay any fee to Google.<sup>36</sup> Tinder, for instance, recently decided to exit Google’s payment system, even though it still has to use Apple’s IAP system and pay the 30% IAP tax on iOS.<sup>37</sup> Epic Games, the maker of Fortnite (one of the most popular games in history), similarly uses its own payment system to avoid fees in its Android

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Samsung, the only other meaningful player in the U.S. premium phone market, has had similar smartphone innovations—its latest flagship phone has been rated at 8.7 compared to similarly priced iPhone’s 8.8—but displays much weaker pricing power. Samsung’s smartphone profits dropped by 42% due to “weak sales momentum . . . and stagnant demand for [its] premium products” after raising prices, demonstrating Apple’s unique pricing power. See Scott Stein, *Apple iPhone XS Max Review*, CNET (Dec. 17, 2018), <https://www.cnet.com/reviews/apple-iphone-xs-max-review>; Jessica Dolcourt, *Galaxy S20 5G Review*, CNET (Mar. 13, 2020), <http://www.cnet.com/reviews/samsung-galaxy-s20-5g-review>; Catherine Shu, *Samsung Posts 55.6% Drop in Second-Quarter Profit as It Copes with Weak Demand and a Trade Dispute*, TECHCRUNCH (July 31, 2019), <https://techcrunch.com/2019/07/30/samsung-posts-55-6-drop-in-second-quarter-profit-as-it-copes-with-weak-demand-and-a-trade-dispute>.

<sup>33</sup> Romain Dillet, *Apple fined \$27 million in France for throttling old iPhones without telling users*, TECHCRUNCH (Feb. 7, 2020), <https://techcrunch.com/2020/02/07/apple-fined-27-million-for-throttling-old-iphones-without-telling-users>.

<sup>34</sup> Will Oremus, *Apple’s Secret Monopoly*, MEDIUM (Feb. 25, 2020), <https://onezero.medium.com/apples-secret-monopoly-5718272c16a5>. Courts have relied on such testimony before. See, e.g., United States v. Am. Express Co., 88 F. Supp. 3d 143, 151-52 (E.D.N.Y. 2015), *rev’d*, 838 F.3d 179 (2d Cir. 2016), *aff’d sub nom.* Ohio v. Am. Express Co., 138 S. Ct. 2274 (2018).

<sup>35</sup> Will v. Comprehensive Accounting Corp., 776 F.2d 665, 671-72 (7th Cir. 1985) (citations omitted).

<sup>36</sup> See Developer Policy Center, *Monetization and Ads*, Google Play (Mar. 9, 2020), <https://play.google.com/about/monetization-ads>.

<sup>37</sup> See Olivia Carville, *Tinder Bypasses Google Play Joining Revolt Against App Store Fee*, BLOOMBERG (July 19, 2019, 2:42 PM EDT), <https://www.bloomberg.com/news/articles/2019-07-19/tinder-bypasses-google-play-joining-revolt-against-app-store-fee>.

version—but the App Store’s rules force Epic Games to continue to use Apple’s IAP.<sup>38</sup> This disparity makes clear that Apple has some “special ability” that others market players lack.

The story of Nintendo provides a telling parallel. Similar to Apple, Nintendo serves as a platform operator and distributes games for third-party developers in the video game console market. Around the late 1980s, when it held market dominance and tied game cartridge manufacturing to distribution, Nintendo charged developers approximately \$44 per game sold.<sup>39</sup> After FTC scrutiny undid the tie, and with competition emerging from Sega, Sony, and Microsoft, Nintendo lowered its royalty rate to \$7 per game.<sup>40</sup> Contrasting Apple’s 30% IAP fee, which has largely remained constant since 2008, with the precipitous drop in Nintendo’s royalty strongly suggests it is the Apple platform’s market power that allows it to maintain a supracompetitive price for the tied service.

## II. IN-APP PURCHASING SYSTEM

Apple’s App Store is the sole channel through which iPhone users may legally download apps.<sup>41</sup> Third-party app developers are required to submit the apps they have created to Apple for its review and approval.<sup>42</sup> Thus, third-party apps cannot reach iPhone consumers without following Apple’s rules and guidelines, including those governing how apps can be monetized.<sup>43</sup> Beyond the

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<sup>38</sup> See Nick Statt, *Fortnite for Android Will Ditch Google Play Store for Epic’s Website*, VERGE (Aug. 3, 2018), <https://www.theverge.com/2018/8/3/17645982/epic-games-fortnite-android-version-bypass-google-play-store>.

<sup>39</sup> See Andrei Hagiu, *Microsoft Xbox: Changing the Game?*, HARVARD BUSINESS SCHOOL, Case No. 9-707-501, at 6-13 (Feb. 6, 2007) (on file with authors).

<sup>40</sup> See *id.*; Andrew Quemere, *The People Versus Mario: The FTC’s Forgotten Investigation into Nintendo in the ’90s*, MUCKROCK (Feb. 2, 2017), <https://www.muckrock.com/news/archives/2017/feb/02/people-versus-mario-ftcs-investigation-nintendo>.

<sup>41</sup> See generally *App Store Review Guidelines*, APPLE (Mar. 8, 2020), [developer.apple.com/app-store/review/guidelines](https://developer.apple.com/app-store/review/guidelines) [hereinafter *App Store Review Guidelines*].

<sup>42</sup> See *id.*

<sup>43</sup> See *id.* § 3. Only after Apple finds that an app is compliant with this set of rules will Apple distribute it to users. See generally *id.*

basic functionality provided by an app, developers may sell bonus features or digital goods within the app interface,<sup>44</sup> such as “subscriptions, in-game currencies, game levels, access to premium content, or unlocking a full version.”<sup>45</sup>

a. Apple’s conduct

For in-app digital goods to be distributed to purchasing users, Apple requires developers to configure their apps so that all purchases of digital goods are channeled through Apple’s in-app purchase (IAP) system, which helps process the transactions.<sup>46</sup> With very limited exceptions, Apple takes a 30% cut of all third-party IAP transactions—the IAP tax.<sup>47</sup> The App Store’s rules forbid app developers from offering alternative payment mechanisms or even providing information about them.<sup>48</sup> Apps violating these rules are rejected or removed from the App Store. The rules thus forcefully combine the IAP system with the distribution of paid digital goods and protect Apple’s continuing ability to impose a burdensome 30% tax that harms developers and consumers alike to the extent of tens of billions of dollars.

Apple essentially stands as a middleman between developers offering in-app digital goods for purchase and iPhone users, but refuses to broker any deal unless developers and consumers use Apple’s expensive payment system. While developers aim to serve iPhone users who are “locked in” to the App Store, they do not similarly seek use of Apple’s supracompetitively priced payment system. But the App Store’s rules—set and enforced by Apple unilaterally—force developers to route their transactions through the IAP. As a result, consumers seeking to purchase high-quality

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<sup>44</sup> See *In-App Purchase*, APPLE (accessed Mar. 9, 2020), <https://developer.apple.com/in-app-purchase>.

<sup>45</sup> *App Store Review Guidelines*, *supra* note 41, § 3.1.

<sup>46</sup> *See id.*

<sup>47</sup> *See id.* § 3; *Five Fast Facts*, SPOTIFY: TIME TO PLAY FAIR (Apr. 30, 2019), <https://timetoplayfair.com/facts>.

<sup>48</sup> “Apps may not use their own mechanisms to unlock content or functionality, such as license keys, augmented reality markers, QR codes, etc. Apps and their metadata may not include buttons, external links, or other calls to action that direct customers to purchasing mechanisms other than in-app purchase.” *App Store Review Guidelines*, *supra* note 41, § 3.1.1.

digital goods at a reasonable price often end up paying an inflated amount or, as recent experience has shown, may be denied the ability to purchase services available on other platforms due to the restrictions imposed by the IAP system.

b. Consumer harm

Consumers suffer harm along several dimensions as a result of Apple's IAP tie. First, iPhone users are forced to pay higher prices for subscription apps and digital services as the IAP overcharge is passed through to consumers. Nearly every major music streaming app, for example, is 30% more expensive on iOS than Android (see Table 1)—except for Apple Music, as Apple exempts its own apps from the 30% fee.<sup>49</sup> Consumer welfare is clearly at stake: subscription apps, such as Spotify, comprise 94% of the top 250 U.S. apps on iOS<sup>50</sup> and are a central component of the user experience; the top 1% of apps generate 93% of total revenue and 80% of new installations.<sup>51</sup> Second, Apple's 30% tax artificially suppresses the competitiveness of app

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<sup>49</sup> See Tidal, Pandora, and YouTube Music's iOS apps, as accessed on April 30, 2019. Spotify, which similarly costs 30% more on iOS, decided to exit the IAP system in 2016 and stopped offering subscriptions on iOS altogether. See *a Timeline: How We Got Here*, SPOTIFY: TIME TO PLAY FAIR (Apr. 30, 2019), [timetoplayfair.com/timeline](http://timetoplayfair.com/timeline). Apple's 30% tax makes it economically infeasible for Spotify et al. to maintain their \$9.99 Android price tag on iOS. If Spotify offered subscriptions at \$9.99, for example, it would lose money on every subscription it sells given its 26% gross profit margin. See SPOTIFY, ANNUAL REPORT (Form 20-F) (2018)

[https://s22.q4cdn.com/540910603/files/doc\\_financials/annual/SPOT\\_20F\\_Master-Master\\_Exhibits\\_HTML.pdf](https://s22.q4cdn.com/540910603/files/doc_financials/annual/SPOT_20F_Master-Master_Exhibits_HTML.pdf). Given Apple Music's dominant position in the market for music streaming services—holding at least 70% of paid iOS listeners in the United States—and Apple's deep pockets, competitors will understandably balk when faced with additional anticompetitive restrictions. About 50 U.S. consumers paid for streaming music in 2018. James Shotwell, *50 Million US Consumers Paid for Streaming Music Last Year, RIAA Says*, HAULIX DAILY (Mar. 1, 2019), [haulixdaily.com/2019/03/streaming-music-subscribers-2019](http://haulixdaily.com/2019/03/streaming-music-subscribers-2019). Although we do not currently have a breakdown of how many of these users are on iOS, even assuming a generous 80% iOS user rate—iOS users account for about 45% of U.S. smartphone users overall—Apple Music's 28 million paid subscribers would make up 70% of the assumed 40 million paid iOS users. See Anne Steele & Tripp Mickle, *Apple Music Overtakes Spotify in Paid U.S. Subscribers*, WALL ST. J. (Apr. 5, 2019), <https://www.wsj.com/articles/apple-music-overtakes-spotify-in-u-s-subscribers-11554475924>; *Mobile OS Market Share in the U.S. 2018*, STATISTA, [www.statista.com/statistics/266572/market-share-held-by-smartphone-platforms-inthe-united-states.\)](http://www.statista.com/statistics/266572/market-share-held-by-smartphone-platforms-in-the-united-states/)

<sup>50</sup> Lexi Sydow, *Subscriptions: The Revenue Model Powering Mobile Apps*, APP ANNIE (Feb. 13, 2020), <https://www.appannie.com/en/insights/market-data/subscriptions-powering-mobile-apps>;

<sup>51</sup> Katie Williams, *The Top 1% of App Publishers Generate 80% of All New Installs*, SENSOR TOWER (Nov. 21, 2019), <https://sensortower.com/blog/top-one-percent-downloads>.

developers and diminishes meaningful consumer choice.<sup>52</sup> Apple’s anticompetitive tax has already lessened head-to-head competition for music streaming services as evidenced by Spotify’s recent pivot away from music (toward podcasts).<sup>53</sup> In some cases, the burden of the IAP fee has forced prominent app publishers to exit the IAP system altogether—Netflix, Kindle, and YouTube TV are prominent examples.<sup>54</sup> As a result, iPhone users, who are locked in to the iOS platform, are frustrated by their inability to buy or subscribe to digital content that is available on other platforms.<sup>55</sup> Third, imposing the IAP fee on app developers hinders innovation in key downstream app markets by raising rivals’ costs. As Apple expands its presence into service markets,<sup>56</sup> the threat of its anticompetitive 30% tax looms ever larger for its rivals—and consumers, who stand to lose from higher prices, diminished competition, and suppressed innovation.<sup>57</sup>

c. Tying

Apple unlawfully ties its proprietary in-app purchase system to paid digital goods distribution services within iPhone apps. Section 1 of the Sherman Act prohibits tying in restraint

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<sup>52</sup> Apple has collected around \$66.4 billion from developers by 2019, a gigantic tax on app innovations. Calculations are based on data disclosed by Apple and assuming a 30% or so take rate. See *Apple Rings in New Era of Services Following Landmark Year*, APPLE (Jan. 8, 2020), <https://www.apple.com/newsroom/2020/01/apple-rings-in-new-era-of-services-following-landmark-year>.

<sup>53</sup> Ben Thompson, *Spotify’s Podcast Aggregation Play*, STRATECHERY, (Feb. 7, 2019), <https://stratechery.com/2019/spotify-podcast-aggregation-play>.

<sup>54</sup> See Juli Clover, *YouTube TV Ending Support for App Store Subscriptions in March*, MACRUMORS (Feb. 13, 2020), <https://www.macrumors.com/2020/02/13/youtube-tv-app-store-subscriptions-ending>; Stuart Dredge, *Netflix Joins Spotify in Bypassing Apple in-App Subscriptions*, MUSIC ALLY (Aug. 22, 2018), <https://musically.com/2018/08/22/netflix-joins-spotify-in-bypassing-apple-in-app-subscriptions>.

<sup>55</sup> Apple forbids apps from even informing customers that the subscription services may be purchased elsewhere (e.g., these apps’ websites). In Spotify’s iPhone app, for instance, customers are only informed that “[y]ou can’t upgrade to Premium in the app. We know, it’s not ideal.” Further, the 30% tax renders unviable many apps’ business models, which stifles innovation. Web apps, subscription-based apps, and middleman-type apps that match users and sellers of digital goods in exchange for a commission are examples of such low-margin apps that will find it very difficult, if possible at all, to exist on iOS.

<sup>56</sup> Kelly Heather, *Apple Event 2019: Everything Announced at Apple’s Big March Presentation*, CNN (Mar. 26, 2019), <https://www.cnn.com/2019/03/25/tech/apple-tv-channels-details/index.html>.

<sup>57</sup> For example, Netflix’s operating profit margin remained below 10% for most of its existence. See *Netflix Operating Margin 2006-2019*, NFLX, MACROTRENDS ( Mar. 12, 2020), <https://www.macrotrends.net/stocks/charts/NFLX/netflix/operating-margin>.

of trade.<sup>58</sup> In addition to market power,<sup>59</sup> per se tying claims usually need to demonstrate that (1) two separate products or services are involved, (2) the sale of one product or service is conditioned on the purchase of another, and (3) there is an anticompetitive effect in the market for the tied product, affecting not an insubstantial amount of interstate commerce.<sup>60</sup>

**Separability.** For two services to be separate, the Supreme Court has held that “there must be sufficient [buyer] demand so that it is efficient for a firm to provide [one service] separately from [another].”<sup>61</sup> Courts have found sufficient separate demand when two offerings were previously sold separately and when other industry suppliers sell the products separately.<sup>62</sup> Apple offered the distribution of in-app subscriptions independent of IAP services until 2011.<sup>63</sup> Moreover, Android allows certain developers to distribute their paid in-app digital goods without using its payment services.<sup>64</sup>

**Forceful Conditioning.** Most courts require some proof of coercion to establish forceful conditioning.<sup>65</sup> Often “a formal agreement is . . . sufficient” to show coercion.<sup>66</sup> Apple expressly

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<sup>58</sup> See HERBERT HOVENKAMP, FEDERAL ANTITRUST POLICY 534 (5th ed. 2016).

<sup>59</sup> See Part I.

<sup>60</sup> See HOVENKAMP, *supra* note 58.

<sup>61</sup> Eastman Kodak Co. v. Image Tech. Servs., Inc., 504 U.S. 451, 462 (1992).

<sup>62</sup> See *id.*; Associated Press v. Taft-Ingalls Corp., 340 F.2d 753, 759-64 (6th Cir. 1965).

<sup>63</sup> See *Apple Launches Subscriptions on the App Store*, APPLE (Feb. 15, 2011), <https://web.archive.org/web/20110307215013/https://www.apple.com/pr/library/2011/02/15appstore.html> (announcing the policy); John Gruber, *Dirty Percent*, DARING FIREBALL (Mar. 1, 2011), [https://daringfireball.net/2011/03/dirty\\_percent](https://daringfireball.net/2011/03/dirty_percent); *Why You Should Fight Apple’s Subscription Extortion*, TREEHOUSE (Feb. 15, 2011), <https://blog.teamtreehouse.com/why-you-should-fight-apples-subscription-extortion> (discussing Apple’s 2011 policy to force subscription apps to use the IAP system);

<sup>64</sup> For example, apps selling songs and ebooks that can be played on other music players or read on other devices can be distributed through the Google Play Store and use their own payment services for user purchases of in-app features. See *Monetization and Ads*, GOOGLE PLAY: DEVELOPER POL’Y CTR (Mar. 9, 2020), <https://play.google.com/about/monetization-ads>; Carville, *supra* note 36. Apple’s own Mac App Store also does not require developers to go through Apple’s IAP system and pay a similar 30% fee in order to distribute their digital goods—indeed 77% of Mac developers choose to avoid the IAP either completely or partially. See Matthew Hughes, *The Mac App Store Is Now Slightly Less Hated by Developers*, THE NEXT WEB (Jun 15, 2017), <https://thenextweb.com/apple/2017/06/15/the-mac-app-store-is-now-slightly-less-hated-by-mac-developers>.

<sup>65</sup> See, e.g., *Paladin Assocs. v. Mont. Power Co.*, 328 F.3d 1145, 1159 (9th Cir. 2003).

<sup>66</sup> *Ungar v. Dunkin’ Donuts of Am., Inc.*, 531 F.2d 1211, 1224 (3d Cir. 1976).

conditions the distribution of in-app digital goods on the use of IAP through the App Store rules, which forbid alternative payment mechanisms.<sup>67</sup> Since developers cannot distribute apps without following these rules, they are being coerced into paying a 30% tax on their sales.

***Anticompetitive Effects.*** Recent cases require showing anticompetitive effects in the tied product market even for per se tying claims.<sup>68</sup> Courts generally consider impacts on price, quality, quantity, and innovation.<sup>69</sup> In two-sided markets, the Supreme Court has required considering both sides as a whole and investigating the net effects on consumers.<sup>70</sup> Here, both sides of the market are worse off due to Apple's tying restraint, yielding a negative net effect.

Consumers face higher prices, diminished competition, and suppressed innovation as a result of Apple's IAP tie.<sup>71</sup> Developers are forced to pay a supracompetitive price for payment services and have reduced choice. Absent the restraint, developers would be able to process their transactions for a significantly lower fee of 2-5%, which is what credit card companies and PayPal charge for processing digital-goods transactions on many Android apps.<sup>72</sup> They could also offer alternative payment methods<sup>73</sup> and potentially reach customers without credit cards.<sup>74</sup>

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<sup>67</sup> See text accompanying note 48.

<sup>68</sup> See *Princo Corp. v. Int'l Trade Comm'n*, 616 F.3d 1318, 1338 (Fed. Cir. 2010); *E & L Consulting v. Doman Indus.*, 472 F.3d 23, 32 (2d Cir. 2006). Establishing illegal tying also requires “that a not insubstantial amount of interstate commerce” in the tied product must be affected, which is a de minimis threshold standard easily met by the IAP processing market that is worth billions of dollars. *See, e.g., Tic-X-Press v. Omni Promotions Co.*, 815 F.2d 1407, 1419 (11th Cir. 1987) (finding that \$10,091 is “not insubstantial”).

<sup>69</sup> See, e.g., *Ohio v. Am. Express Co.*, 138 S. Ct. 2274, 2282, 2288-90 (2018).

<sup>70</sup> See *id.* at 2287, 2302.

<sup>71</sup> Supra Section II.b.

<sup>72</sup> See *Monetization and Ads*, GOOGLE PLAY: DEVELOPER POL'Y CTR. (Mar. 9, 2020), <https://play.google.com/about/monetization-ads>; Gruber, *supra* note 63.

<sup>73</sup> One method is payment using a QR code—a method that has broad appeal in developing countries (particularly in China). *See Serenitie Wang, Why China Can't Get Enough of QR Codes*, CNN BUSINESS (Sept. 8, 2017, 6:46 AM EST), <https://money.cnn.com/2017/09/08/technology/china-qr-codes/index.html>.

<sup>74</sup> Such customers represent approximately 90 percent of the hundreds of millions of consumers in developing countries that may generate sales for U.S. developers and help spur innovation for American consumers as well. *Rurika Imahashi & Mitsuru Obe, Credit Cards Fall Behind in Asia's Race to Go Cashless*, NIKKEI ASIAN REV. (2019), <https://asia.nikkei.com/Business/Business-trends/Credit-cards-fall-behind-in-Asia-s-race-to-go-cashless>.

Tying can also be established under the rule of reason if the tie's harm outweighs its procompetitive efficiencies.<sup>75</sup>

### **III. REMOVING COMPETITORS FROM APP STORE**

#### a. Apple's conduct

Apple has used its control over the App Store to altogether bar developers of rival apps from the platform. A prominent example is Apple removing or restricting screen-time apps after it decided to create its own screen-time tracker.<sup>76</sup> Apple told developers that their apps violated App Store policies, even though the company “had allowed such practices for years and had approved hundreds of versions of their apps.”<sup>77</sup> And when companies asked what they could do to make their app comply, Apple simply responded, “Your app has an unresolved issue and has been removed from the App Store.”<sup>78</sup>

Apple has claimed that its removal of these apps was motivated by privacy and safety concerns, but its timing has been suspicious. When it reinstated these competing apps, it did so the same day that the media reported that the Department of Justice (DOJ) would be handling any potential antitrust investigation into Apple.<sup>79</sup> Its remedy for its alleged privacy concerns was bizarre—it allowed the apps back on so long as they agreed not to “sell, use or disclose to third parties any data for any purpose.”<sup>80</sup> Apple could have easily attached this proviso when it first

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<sup>75</sup> See United States v. Microsoft Corp., 253 F.3d 34, 84-97 (D.C. Cir. 2001) (en banc) (adopting rule of reason approach to the analysis of tying cases with respect to software platforms). For an analysis of the efficiencies, see *infra* Part V.

<sup>76</sup> Jack Nicas, *Apple Cracks Down on Apps That Fight iPhone Addiction*, N.Y. TIMES (Apr. 27, 2019), <https://www.nytimes.com/2019/04/27/technology/apple-screen-time-trackers.html>.

<sup>77</sup> *Id.*

<sup>78</sup> *Id.*

<sup>79</sup> *Id.*

<sup>80</sup> *Id.*

flagged its concerns. As the CEO of Freedom, a competing app, put it, “Why this last year of pain? And we end up exactly in the same place.”<sup>81</sup>

Even though Apple reinstated these apps, their claims may not be moot.<sup>82</sup> Still, other plaintiffs can likely be found, as Apple has refused to approve apps that compete with its own “Find My Friends” app,<sup>83</sup> as well as the mobile app for Steam, a video-game service. The rejection of Steam was explained by citing a “business conflict,”<sup>84</sup> which casts the launch of the Apple Arcade app a year later in a suspicious light.<sup>85</sup> Further, payment-services apps have complained about being rejected from the App Store; Samsung reported its Pay Mini app was rejected without any explanation.<sup>86</sup> Looking forward, Apple will compete with more apps on its App Store as it expands into services.<sup>87</sup>

b. Consumer harm

Apple’s conduct towards competitors harms consumers, illustrated concretely by the example of screen-time apps. After Apple removed rivals OurPact and Mobicip, consumers who turned to Apple’s own screen-time tool found it “more complicated and less restrictive.”<sup>88</sup> Apple’s product was also more susceptible to user circumvention and less nimble—it had no feature to allow parents to quickly disable features on their children’s phones and required parents and

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<sup>81</sup> *Id.*

<sup>82</sup> Because Apple voluntarily allowed the apps back on and may revoke their access after the theoretical case has been dismissed, these plaintiffs may be able to survive a mootness challenge. See *United States v. W.T. Grant Co.*, 345 U.S. 629, 632 (1953).

<sup>83</sup> Peter Kafka, *Spotify Says Apple Won’t Approve a New Version of Its App Because It Doesn’t Want Competition for Apple Music*, VOX (June 30, 2016, 12:45 PM EST), <https://www.vox.com/2016/6/30/12067578/spotify-apple-app-store-rejection>.

<sup>84</sup> Nick Statt, *Apple Rejects Valve’s Steam Link Game Streaming App over ‘Business Conflicts’*, VERGE (May 24, 2018, 8:59 PM EST), <https://www.theverge.com/2018/5/24/17392470/apple-rejects-valve-steam-link-app-store-ios-game-steaming>.

<sup>85</sup> *Id.*; Newsroom, *Apple Arcade: It’s Time to Play*, APPLE (Sept. 16, 2019), <https://www.apple.com/newsroom/2019/09/apple-arcade-its-time-to-play>.

<sup>86</sup> Dutch ACM Study, *supra* note 8, at 79.

<sup>87</sup> See *supra* Introduction.

<sup>88</sup> Nicas, *supra* note 76.

children both to own iPhones.<sup>89</sup> By denying rivals access to the App Store, Apple gives consumers fewer and worse options to choose from. And because switching app ecosystems entails such high costs,<sup>90</sup> consumers will stay on the platform, even though they suffer decreased choice and quality. In the longer term, Apple removing its competitors creates fear of Apple's opportunism that deters new developers from entering and existing developers from innovating on their products.

c. Potential antitrust violations

1. **Monopoly power**

The relevant markets for this category of conduct are the downstream app markets where Apple competes with third-party developers. With screen-time apps, for instance, the market would consist of all services with reasonably substitutable abilities to track and control users' time spent on their iPhones. Determining whether Apple has monopoly power in a specific downstream app market can be shown through high market share.<sup>91</sup> In the case of screen-time apps, market share may be sufficiently high because Apple's Screen Time app is installed by default on every iPhone running iOS 12 or higher. But determining Apple's market share requires more fact research, as it depends on the number of consumers using screen-tracking products and how many of those consumers use Apple's Screen Time.

Alternatively, monopoly power can also be shown through direct evidence by asking whether Apple can "control prices or exclude competition."<sup>92</sup> In markets like screen-time apps, plaintiffs could show market power by pointing to Apple's ability to "power to exclude competition from the relevant market generally" by virtue of its control over the App Store.<sup>93</sup>

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<sup>89</sup> *Id.*

<sup>90</sup> See *supra* Section I.a.

<sup>91</sup> See *Exxon Corp. v. Berwick Bay Real Estate Partners*, 748 F.2d 937, 940 (5th Cir. 1984) ("[M]onopolization is rarely found when the defendant's share of the relevant market is below 70%.").

<sup>92</sup> *United States v. E.I. duPont de Nemours & Co.*, 351 U.S. 377, 391 (1956).

<sup>93</sup> *L.A. Land Co. v. Brunswick Corp.*, 6 F.3d 1422, 1426-27 (9th Cir. 1993).

Apple’s moves to remove or restrict 11 of the top 17 most-downloaded screen-time apps stands in contrast to cases where courts have dismissed Section 2 claims for highlighting the exclusion of only a single competitor.<sup>94</sup> Though Apple’s conduct is directed at competitors, the Eleventh Circuit recognized in *McWane* that “in a competitive market . . . injury to a single competitor may not have a significant effect on overall competition due to the persistence of other rivals,” but “competitors and competition are linked, particularly in the right market settings.”<sup>95</sup> In the case of screen-time apps, Apple’s control over the App Store allowed it to reduce the competition it faced by removing rivals, which immediately reduced consumer choice and quality, given its own app’s more limited functionalities.

Further, Apple’s monopoly power could potentially be shown through its lower quality offerings, although this may be difficult to prove; even if Apple’s service had worse features than that of its rivals, its product would likely offer some advantage by virtue of being integrated into iOS. Still, quality harms are central to competition in the app market and therefore worth monitoring, as many apps do not compete on price because they are free.

## **2. Essential facilities**

The App Store presents one of the “limited circumstances” where a company refusing to deal with its competitors rises to the level of violating the antitrust laws.<sup>96</sup> What distinguishes the App Store from a generic company denying access to a competitor is that Apple’s app platform is an essential facility under the test developed in *MCI Communications v. AT&T*, which requires (1) control of the essential facility by a monopolist; (2) a competitor’s inability to duplicate the essential facility; (3) the denial of the use of the facility to a competitor; and (4) the feasibility of

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<sup>94</sup> See e.g., PNY Techs., Inc. v. SanDisk Corp., 2012 U.S. Dist. LEXIS 55965 at \*27 (“PNY has identified only one specific instance of a competitor leaving the market.”).

<sup>95</sup> *McWane, Inc. v. Fed. Trade Comm’n*, 783 F.3d 814, 836 (11th Cir. 2015).

<sup>96</sup> *Pacific Bell Tel. Co. v. Linkline Commc’ns, Inc.*, 555 U.S. 438, 447-48 (2009).

providing the facility.<sup>97</sup> Apple undeniably controls the App Store and has removed rivals from the platform, satisfying elements of (1) and (3).

**(1) Essential to the mobile-app economy.** In the mobile-app market, the App Store is a critical distribution point that connects developers and users. In its mediating role, the App Store helps consumers discover new services,<sup>98</sup> and helps developers reach critical masses of consumers without the costly need to build brand recognition.

Denying developers from the App Store would “inflict[] a severe handicap on potential market entrants”<sup>99</sup> because developers cannot reach consumers effectively without access to distribution. Further, the Android platform is not an alternative. iPhone users are locked into iOS, and there is little cross-platform competition between iOS and Android, meaning developers cannot reach captive iPhone users by offering their apps on the Android platform.<sup>100</sup>

**(2) Developers’ inability to duplicate an app platform.** Asking developers to create their own app platform is infeasible and unwise. The entire point of an app platform is to create a central place for developers and consumers to meet and transact. App platforms accordingly derive value from indirect network effects—that is, having more apps on the platform attracts more consumers, and vice versa. So asking developers to create their own is the 21<sup>st</sup>-century equivalent of requiring “every railroad company provide its own track” when “all incoming trains should reach a common focus.”<sup>101</sup> In the mobile-app market, absurdity and inefficiency would result—requiring

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<sup>97</sup> 708 F.2d 1081, 1132-33 (7th Cir. 1983).

<sup>98</sup> As the Dutch Competition Authority’s market study on mobile apps reported, “[A]pp stores are an important channel to discover new apps since around one half of app downloads concern apps that consumers would not have known or downloaded otherwise.” *Dutch ACM Study*, supra note 8, at 23.

<sup>99</sup> *Hecht v. Pro-Football, Inc.*, 570 F.2d 982, 992 (D.C. Cir. 1977).

<sup>100</sup> See *supra* Introduction.

<sup>101</sup> The Supreme Court, contemplating this possibility in *Terminal Railroad*, lambasted the ludicrousness of this ask: “[N]ot only would the expense of obtaining the necessary rights of way be so enormous as to amount to the exclusion of all but a few of the strongest roads, but, if it could be accomplished, the city would be cut to pieces with the many lines of railroad intersecting it in every direction, and thus the greatest agency of commerce would become the greatest burden.” *United States v. Terminal Rail Ass’n*, 224 U.S. 383, 403 (1912).

developers to create their own app platform would hinder users’ ability to discover apps and impede developers from entering in the first place, given the crushing entry costs they would bear.

**(4) Feasibility.** Requiring Apple to allow rival apps onto its platform is feasible, as demonstrated by its prior course of conduct with its screen-time competitors and also its subsequent decision to allow them back onto the App Store. And while Apple may cite privacy or security concerns for removing apps, a less restrictive alternative would be for Apple to announce and enforce the terms in its policies, rather than subjecting third-party apps to the risk of being removed at any time at Apple’s unilateral discretion.

**Dispelling general concerns.** The *Trinko* Court’s concerns with essential facilities do not apply or apply with attenuated force for Apple.<sup>102</sup> Unlike Verizon, Apple is not subject to any regulation that compels it to share access. The lack of a regulatory overlay in the mobile-app market means that the antitrust laws bear primary responsibility for ensuring the market’s competitiveness.<sup>103</sup>

Further, the Court worried that “[c]ompelling such firms to share the source of their advantage . . . may lessen the incentive for the monopolist, the rival, or both to invest in those economically beneficial facilities.”<sup>104</sup> But this concern ignores that there is also innovation occurring on the platform that Apple’s conduct is precluding. Arguably, there is greater scope for innovation in the app market as opposed to the OS. The App Store has driven mobile-app innovation—twice as many iOS apps later appear on the Android platform compared to the

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<sup>102</sup> *Verizon Commc’ns Inc. v. Law Offices of Curtis V. Trinko, LLP*, 540 U.S. 398 (2004).

<sup>103</sup> “Where such a structure exists,” the *Trinko* Court stated, “the additional benefit to competition provided by antitrust enforcement will tend to be small, and it will be less plausible that the antitrust laws contemplate such additional scrutiny.” *Id.* at 412.

<sup>104</sup> *Id.* at 407–08.

reverse.<sup>105</sup> The more concrete and immediate harms to innovation on the platform should be considered alongside the traditional concerns about dampening competition between platforms.

### **3. Refusal to deal**

For years, Apple had allowed paid parental-control apps on the App Store and benefited from the 30% fee developers paid. When Apple developed its own parental-control apps and removed rivals from the App Store, it lost fees from those products and gained no subscription revenue, as its own offering was free with a software update. Apple's decision to terminate a voluntary, profitable course of dealing shows an intent to improperly exclude rivals.<sup>106</sup>

### **4. Monopoly leveraging**

Removing rival apps from the App Store also gives rise to a monopoly leveraging claim.<sup>107</sup> Specifically, Apple has monopoly power in the mobile-platform market<sup>108</sup> and is using that platform to exclude rivals explicitly. In foreclosing rivals, Apple has a dangerous probability of monopolizing the secondary app market. By virtue of its totalizing control, Apple can remove all competitor apps in any given category, leaving its own product as the sole offering. Locked-in iPhone consumers will have no recourse to download mobile apps from another source. Stated simply, Apple's all-encompassing power to constrain app downloads to the App Store and then control what is offered on the App Store creates a dangerous probability of success.

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<sup>105</sup> Shannon Liao, *Apple's Total Number of Apps in the App Store Declined for the First Time Last Year*, VERGE (Apr. 5, 2018, 6:07 PM EST), <https://www.theverge.com/2018/4/5/17204074/apple-number-app-store-record-low-2017-developers-ios>.

<sup>106</sup> *Trinko*, 540 U.S. at 398. “Improper exclusion (exclusion not the result of superior efficiency) is always deliberately intended.” *Aspen Skiing*, 472 U.S. 585, 604 (1985) (quoting ROBERT BORK, THE ANTITRUST PARADOX 160 (1978)).

<sup>107</sup> *Trinko* lays out the current requirements for a leveraging claim. See 540 U.S. at 415 n.4 (2004).

<sup>108</sup> See *supra* Part II.

## IV. SELF-PREFERENCING

### a. Apple's conduct

Apple's integrated system gives it multiple levers to advantage itself over rivals—to the detriment of consumers.

**30% tax on rivals.** Apple takes a 30% cut from all third-party IAP transactions.<sup>109</sup>

Apple's own proprietary apps such as Apple Music are not subject to the same 30% tax.

**Preferential search results and visual prominence on the App Store.** An app's visual prominence on the App Store is crucial to consumers discovering and downloading the app.<sup>110</sup> Apple has consistently favored its apps by displaying them more prominently than similar apps in App Store search results and on the App Store home page.<sup>111</sup> For instance, Apple Arcade has an entire tab on the App Store, which serves as a prominent in-feed ad for the service.<sup>112</sup>

**Promotions and marketing restrictions on rivals.** Apple aggressively markets its proprietary apps through push notifications that request users to re-subscribe,<sup>113</sup> but it restricts rivals from deploying the same tactics.<sup>114</sup>

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<sup>109</sup> See *supra* Section II.a.

<sup>110</sup> Nicas & Collins, *supra* note 1 (noting that two-thirds of app downloads started with a search). Apple would concede the importance of search, having generated \$50 billion in App Store sales in 2019. Further, empirical evidence shows that 44% of consumers choose the app that comes first in the search results, and up to 87% of the consumers choose an app from the top 5 results, which are mostly presented at the same time without the need to scroll down. See Leyla Dogruel et al., *Choosing the Right App: An Exploratory Perspective on Heuristic Decision Processes for Smartphone App Selection*, 3 MOBILE MEDIA & COMM'N 125 (2014).

<sup>111</sup> Tripp Mickle, *Apple Dominates App Store Search Results, Thwarting Competitors*, WALL ST. J. (July 23, 2019), <https://www.wsj.com/articles/apple-dominates-app-store-search-results-thwarting-competitors-11563897221>. According to an analysis of six years of search results compiled by Sensor Tower, an app analytics firm, Apple's apps have ranked first for at least 700 of roughly 60,000 search terms in the store. See Nicas & Collins, *supra* note 1.

<sup>112</sup> See *The Paywalled Garden: iOS Is Adware*, STEVE STREZA (Feb. 17, 2020), <https://stevestreza.com/2020/02/17/ios-adware>.

<sup>113</sup> *Id.*

<sup>114</sup> For instance, it has restricted information about premium subscription and promotional campaigns from Spotify, Apple Music's biggest competitor, through its control of the App Store review system. Apple rejected several Spotify app updates for using promotional language, such as "Get 3 months now for €0.99" or "Get in, Get Premium," while Apple Music was able to use such promotional language. See *A Timeline: How We Got Here*, SPOTIFY: TIME TO PLAY FAIR, <https://www.timetoplayfair.com/timeline>.

**Data access.** Requiring IAP grants Apple full access to consumers' payment data,<sup>115</sup> which allows Apple to learn from the performance of downstream competitors and use this information to improve its own offerings. Beyond payment data, Apple can also monitor how much time users spend on particular apps and has used that information to decide what products to develop.<sup>116</sup> Third party developers lack such data.

**Communicating with iOS/hardware.** Apple has also restricted interoperability of its operating system to bar certain apps from accessing its APIs, such as Siri.<sup>117</sup> Apple's apps, on the other hand, were able to use their ecosystems to their fullest.<sup>118</sup> Apple also restricts rival app developers from accessing iPhone functionalities. In current and past versions of iOS, Apple allowed only its Apple Pay app to access the iPhone's NFC chip. NFC technology is used to seamlessly transfer data between devices and is most often used by mobile payment services.

**Sherlocking.** Apple can closely monitor the success of other apps and pluck rivals' winning concepts for itself without expending the costs to determine whether a project would be viable. Over the years, Apple has created its own version of features that were offered first in third-party apps including its "Measure" app, animated emojis, swipe-typing and most recently, period tracking.<sup>119</sup> Apple's co-opting of these features often renders rivals' offerings redundant.

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<sup>115</sup> Dutch ACM Study, *supra* note 8

<sup>116</sup> Albergotti, *supra* note 27.

<sup>117</sup> Dutch ACM Study, *supra* note 8, at 83.

<sup>118</sup> *Id.*

<sup>119</sup> Albergotti, *supra* note 27.

**App Store Guidelines.** At its sole discretion, Apple can restrict apps that violate its vague “Review Guidelines.”<sup>120</sup> Apple has invoked these guidelines to force competitors to remove key functionalities from their apps.<sup>121</sup>

**Device defaults.** Apple has employed defaults to steer consumers towards its preferred offerings.<sup>122</sup> Because consumers often cannot change these default settings, the settings allow Apple to lock in consumers to its products by raising the cost of accessing third-party offerings for the same services.<sup>123</sup>

b. Consumer harm

**Raising rivals’ costs.** The combined effect of Apple’s self-preferencing behavior is to raise rivals’ costs. For instance, the 30% discriminatory tax means that even an equally efficient competitor must charge higher prices than Apple.<sup>124</sup> In some cases, these rivals may not be able to compete with Apple on price and may be excluded from the App Store, resulting in less choice for consumers. The reduced ability to compete on price may also facilitate tacit collusion where rivals raise their price along with Apple, softening price competition.

Apple’s promotional restrictions on rivals harms competition. Customers are deprived of valuable promotional information that would have otherwise increased their knowledge about

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<sup>120</sup> Nicas, *supra* note 76. On Apple’s standards, its Guidelines state, “We will reject apps for any content or behavior that we believe is over the line. What line, you ask? Well, as a Supreme Court Justice once said, ‘I’ll know it when I see it.’ And we think that you will also know it when you cross it.” *App Store Review Guidelines*, *supra* note 41.

<sup>121</sup> Nicas, *supra* note 76.

<sup>122</sup> Defaults nudge consumers toward the choice desired by the platform, especially when there is inertia or uncertainty in decision making by the consumer.

<sup>123</sup> For example, when a consumer clicks on a website link in a text it always opens in Safari; if they use voice commands through Siri to open up a music streaming app, Apple Music is opened; when they click on a physical address directions on a website, Apple Maps launches. For all these apps, third-party alternatives are available yet it is not possible for the third-party app developer nor the consumers to change the defaults in their app. See *Dutch ACM Study*, *supra* note 8.

<sup>124</sup> For instance, when Spotify still offered the possibility to subscribe, it increased its price from €9.99 a month to €12.99 for a subscription through the App Store, while all other channels charged €9.99 a month. Chris Welch, *Spotify Urges iPhone Customers to Stop Paying Through Apple’s App Store*, VERGE (July 8, 2015, 12:17 PM EST), <https://www.theverge.com/2015/7/8/8913105/spotify-apple-app-store-email>.

alternatives and consequently improved price competition. These restrictions also increase rivals' costs by forcing them to seek other (and likely more expensive) forms of advertising. Limiting rivals' access to data also increases their costs relative to Apple. Apple can learn from the performance of downstream competitors and use this knowledge to improve its own offerings. Rivals cannot. Restrictions on interoperability also increase rivals' costs.

***Features of digital platforms.*** This effect of raising rivals' costs is exacerbated in digital platform markets because of network effects, economies of scope/scale, and the ability of platforms to take advantage of consumers' behavioral biases through defaults and framing. These features increase platforms' ability to leverage market power from one market to another and contribute towards the tendency of digital-platform markets to tip towards monopoly.

The example of Spotify and Apple Music illustrates how these features exacerbate the effects of raising rivals' cost on competition, both in the present and the future. By raising Spotify's costs through self-preferencing, Apple Music stands to gain additional users. These additional users are far more valuable than just the extra subscription fee that Apple Music obtains, for several reasons. First, when network effects are present, switching users will increase the value of Apple Music by making it more attractive to other users. In music streaming, we expect network effects because users of the same streaming service can easily share playlists and follow each other. Second, data from users' music streaming behavior can be used to generate revenues in other ways—for example, data can be sold to advertisers or music artists. Finally, Apple benefits from economies of scale in user data that it can use to improve its service. As a result, self-preferencing by Apple hurts rivals both now and in the future. By limiting rivals' access to users, Apple may prevent competitors from achieving the scale they need to be profitable and invest in future innovation.

**Cross-platform competition.** Moreover, by weakening cross-platform apps like Spotify, Apple can deter entry from other smartphone platforms and thereby weaken cross-platform competition. Absent Apple's conduct, an entrant smartphone platform could offer an array of high-quality apps available outside iOS, like Spotify and Facebook. The presence of successful and highly demanded cross-platform apps results in buyers caring less about the underlying operating system when purchasing a smartphone. For example, in China, where WeChat plays a central role in consumers' digital lives, the iOS retention rate is at 50%, almost half of the rate in the U.S. which stands at 89%.<sup>125</sup> A cross-platform app weaker than its Apple counterpart decreases the attractiveness of a new smartphone OS, as the platform depends on indirect network effects from app offerings. This promotes lock-in to iOS. Tellingly, many Apple apps are confined to the iOS platform.<sup>126</sup>

**Consumers' limited attention.** In addition, search-ranking manipulation and default settings are particularly effective in platform markets since consumers tend to focus on the first few search results presented to them and default to one service, a phenomenon known as single-homing. Even if opting for the most visible option is more convenient for some consumers in the short run, the impact on competition may harm consumers with fewer choices, lower quality products, and higher prices in the long run.

**Innovation.** By blocking developers from using certain iPhone technologies like the NFC chip, Apple completely excludes mobile-payments competitors and stymies developers from developing innovative uses for the NFC chip.<sup>127</sup> Moreover, Apple's imitation will likely discourage new apps from innovating because they fear expropriation. The apps that Apple designs

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<sup>125</sup> See *infra* Figure 1.

<sup>126</sup> While currently Apple Music is available on Android, Apple can reverse this decision at any point.

<sup>127</sup> See, e.g., Ben Thompson, *Integration and Monopoly*, STRATECHERY (Nov. 18, 2019), <https://stratechery.com/2019/integration-and-monopoly>.

to supplant them may be of a lower quality and designed to preserve its dominant position.<sup>128</sup> These effects deprive consumers of choice, quality, and innovation.

c. Potential antitrust violations

1. Microsoft-like monopolization

Defensive leveraging behavior helps a monopolist extend the life of its primary monopoly by preventing splintering and next-generation substitution. In many ways, the challenge from future platforms to iOS is similar to Netscape's threat to Windows, where a rising Internet browser could commoditize the PC operating system monopoly Microsoft held by providing web software applications that users desired regardless of the underlying OS.<sup>129</sup> In limiting the rise of future platforms on top of iOS, the effect of Apple's actions is not unlike that of what Microsoft did around the turn of the century to prolong its PC OS monopoly, which the D.C. Circuit found to be illegal monopolization.<sup>130</sup> This kind of defensive leveraging is a natural and effective weapon for preserving the primary monopoly.<sup>131</sup>

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<sup>128</sup> For example, after blocking a number of screen-time and parental-control apps from the App Store, Apple introduced its own version which required the whole family to own iPhones. Many apps removed by Apple allowed parents with iPhones to control their children's Android devices. See Nicas, *supra* note 14.

<sup>129</sup> See United States v. Microsoft Corp., 253 F.3d 34, 53, 60 (D.C. Cir. 2001) (en banc) (finding Netscape is "middleware" that exposes its own APIs (interfaces for third-party developers) and "could take over some or all of Windows's valuable platform functions" which can erode Microsoft's Windows monopoly, as "[a]pplications written to a particular browser's APIs . . . would run on any computer with that browser, regardless of the underlying operating system" and consumers would as a result "no longer feel compelled to select Windows.").

<sup>130</sup> See *id.* at 64, 71, 72, 76-78 (finding series of Microsoft's restrictive or exclusive agreements with OEMs, internet access providers, independent software vendors, and Apple to limit rival browsers, such as Netscape, as well as its actions to undermine non-Microsoft Java virtual machines—another middleware—"represent uses of Microsoft's market power to protect its monopoly" over computer operating system or constitute "exclusionary devices," which "violate § 2 of the Sherman Act"); Robin Cooper Feldman, *Defensive Leveraging in Antitrust*, 87 GEO. L.J. 2079 (1999). While Microsoft relied on external partners to limit the distribution of rival browsers and Java virtual machines, Apple can undermine multi-homing apps and future platforms on its own, thanks to its tight grip over the iOS ecosystem.

<sup>131</sup> Feldman, *supra* note 130.

## 2. Monopoly leveraging

As the only device manufacturer for iOS, Apple leverages this bottleneck position and uses robust vertical integration to move its dominance to adjacent markets.<sup>132</sup> The *Trinko* Court held that for such a leveraging theory to be sustained, the firm must actually monopolize or have a “dangerous probability of success” in monopolizing the second market.<sup>133</sup> Apple’s all-encompassing power to constrain app downloads to the App Store and then control what is offered on the App Store creates a dangerous probability of success.<sup>134</sup>

Even short of probable monopolization, leveraging can still significantly harm competition. There are concerns that such a leveraging theory may sweep too broadly and condemn that which should be viewed as pro-competitive.<sup>135</sup> However, we find that this is a narrow interpretation of the doctrine that is outdated in the digital-platform era as it excludes defensive leveraging and ignores monopolistic leveraging into new dynamic network markets. This can consequently stifle innovation and significantly slow the rise of new platforms regardless of the actual monopolization of these markets. Courts take this conservative approach because they are concerned that allowing monopolistic leveraging as an independent claim of exclusionary conduct “might chill competition, rather than foster it.”<sup>136</sup> This is further buttressed by the largely Chicago School notion that monopoly leveraging as an antitrust theory cannot increase a monopolist’s profits because “a monopolist can take its monopoly profit just once.”<sup>137</sup> The rationale is that unless the monopolist’s leveraging is efficient, it cannot extract additional profit from a second market as

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<sup>132</sup> Thomas Eisenmann et al., *Platform Envelopment*, 32 STRATEGIC MGMT. J. 1270 (2011); Annabelle Gawer & Michael A. Cusumano, *How Companies Become Platform Leaders*, 49 MIT SLOAN MGMT. REV. 28 (2008).

<sup>133</sup> See 540 U.S. 398, 415 n.4 (2004), (citing *Spectrum Sports, Inc. v. McQuillan*, 506 U.S. 447, 459 (1993)).

<sup>134</sup> See *supra* Section III.c.3.

<sup>135</sup> Samuel R. Miller, *Is Amazon Violating the Antitrust Laws?*, JUSTIA: VERDICT (July 25, 2019) <https://verdict.justia.com/2019/07/25/is-amazon-violating-the-antitrust-laws>.

<sup>136</sup> See *Spectrum Sports*, 506 U.S. at 458.

<sup>137</sup> See *Schor v. Abbott Laboratories*, 457 F.3d 608, 611 (2006).

buyers pay for the two products as a package.<sup>138</sup> However, the “one monopoly profit” argument is based on special assumptions including static market competitiveness, lack of transaction costs, and fixed proportion usage.<sup>139</sup> These assumptions do not hold in platform economies with strong dynamic network effects where leveraging can effectively alter market power.<sup>140</sup> Due to high switching costs<sup>141</sup> and information costs accruing from limited consumer resources and sophistication, as well as behavioral biases, buyers in platform markets are also unable to comprehensively assess secondary market prices.<sup>142</sup> Owing to the differing nature of infrequent smartphone purchases and more regular app transactions, consumers are unlikely to fully factor in app prices when purchasing a smartphone. Such a leveraging strategy is highly likely given Apple’s aggressive push into services.<sup>143</sup>

### **3. Essential facilities—unreasonable access**

Apple’s self-preferencing conduct can give rise to an extension of the essential facilities claim laid out in Section III.C.1. Though Apple’s actions did not totally foreclose rival apps from the App Store, developers were denied “reasonable access” to an essential facility.<sup>144</sup>

Defining “reasonable access” is central to this claim. In 1981, the District Court for the District of Columbia drew on *Terminal Railroad*’s definition of “reasonable access” as requiring the facilities owner to provide “just and reasonable terms and regulations as will, in respect of use, character and cost of services, place every such company upon as nearly as equal plane as may

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<sup>138</sup> See HOVENKAMP, *supra* note 57, at 426, 565.

<sup>139</sup> See Einer Elhauge, *Tying, Bundled Discounts, and the Death of the Single Monopoly Profit Theory*, 123 HARV. L. REV. 397, 403-19 (2009).

<sup>140</sup> See *id.* at 413; *supra* Section III.b.

<sup>141</sup> See Introduction.

<sup>142</sup> See Shili Shao, Antitrust in the Consumer Platform Economy, Part II (May 11, 2020) (manuscript).

<sup>143</sup> See Introduction.

<sup>144</sup> Laurel Sand & Gravel, Inc. v. CSX Transp., Inc., 924 F.2d 539 (4th Cir. 1991).

be.”<sup>145</sup> The court clarified that this standard did not require “absolute equality of treatment”; rather, consideration of “problems of feasibility and practicability” in determining what was reasonable access was appropriate.<sup>146</sup> But at the very least, raising a claim of unreasonable access requires a court to undertake fact findings to determine whether access was reasonable.<sup>147</sup>

On the specific question of Apple’s 30% charge on App Store transactions, reasonable price turns on magnitude. The case law on this issue is “relatively sparse.”<sup>148</sup> The primary guideposts are the Fourth Circuit’s holding that a railroad’s offer that charged a penny over its variable costs was reasonable,<sup>149</sup> contrasted with the Second Circuit finding that a sudden 800% price increase was sufficient to survive summary judgment.<sup>150</sup> Finding that the 30% tax substantially exceeds Apple’s marginal costs for the platform may help support a finding of “unreasonable access” under *Laurel Sand*.<sup>151</sup>

Apple would likely cast its self-preferencing conduct as reasonable by arguing that its choices create efficiencies for consumers. While monopolists can be excused from sharing their essential facility if they have “legitimate business reasons,”<sup>152</sup> Apple’s likely justifications are insufficient.<sup>153</sup> Beyond undercutting Apple’s purported efficiencies, enforcers can contrast Apple’s conduct with Android’s choices to show that certain practices are not infeasible or

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<sup>145</sup> United States v. AT&T, 524 F. Supp. 1336, 1353 (D.D.C. 1981) (quoting United States v. Terminal R.R. Ass’n, 224 U.S. 383, 411 (1912)).

<sup>146</sup> *Id.* at 1360-61.

<sup>147</sup> *Trinko*, 294 F.3d at 326 (finding that what constitutes reasonable access is an “[issue] of fact that cannot be resolved on [ ] motion to dismiss”).

<sup>148</sup> *Delaware & H.R. Co. v. Conrail*, 902 F.2d 174, 180 (2d Cir. 1990).

<sup>149</sup> *Laurel Sand*, 924 F.2d 539, 544-45 (4th Cir. 1991).

<sup>150</sup> *Conrail*, 902 F.2d at 180.

<sup>151</sup> *Conrail* offers less guidance because it discusses a price increase. *Id.* at 177.

<sup>152</sup> *City of Anaheim v. So. Cal. Edison Co.*, 955 F.2d 1373, 1381 (9th Cir. 1992); *Laurel Sand* at 544-45.

<sup>153</sup> *Infra* Section V.

impractical. For instance, Android allows developers to connect to its phones' NFC chip, showing that granting access is possible.<sup>154</sup>

On feasibility, asking Apple to give access to the App Store, iPhone systems, or consumer data would require the court to assume a more regulatory role. But a court would have a standard to use, as they can judge competitors' access against the terms Apple provides to itself and relieve Apple from obligations where sharing would be infeasible or impractical. Further, Apple has shown that some form of shared access on its defaults is possible: it has allowed Clue—a period tracking app—to integrate into its own Health App, which is included in Apple's default package of apps on any iPhone.

#### **4. Constructive refusal to deal**

Apple didn't remove a number of other apps from the App Store when it created its own, free copy-cat offerings that mirrored them, because it didn't need to. Rather, when it added those apps to iOS directly, it achieved largely the same result. Thus, while Apple did not repudiate its longstanding profitable relationships in form, in substance, it all but did so. It walked away from ongoing, commercially beneficial business engagements to roll out free software that generated no revenue. This conduct is in essence the sort of behavior that *Trinko* makes clear is unlawful.<sup>155</sup>

#### **5. Parallels with EU Google Shopping**

Apple's self-preferencing conduct on the App Store, in particular search ranking manipulation, bears similarities to Google's condemned conduct in the EU Google Shopping case. The European Commission fined Google EUR 2.42 billion in June 2017 for abusing its dominant position in the market for search queries to give its price comparison shopping service an illegal

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<sup>154</sup> *Sharing Files with NFC*, ANDROID DEVELOPER, <https://developer.android.com/training/beam-files>.

<sup>155</sup> See *Trinko*, 540 U.S. at 409 (distinguishing case from *Aspen Skiing* by noting that defendant did not terminate a “voluntary (*and thus presumably profitable*) course of dealing” that suggested a “willingness to forsake short-term profits to achieve an anticompetitive end”) (emphasis in original).

advantage over its rivals. According to the Commission, Google's preferential treatment towards its own comparison shopping services combined with simultaneous demotion of rival services distorted traffic away from competitors and towards Google's own services. The Commission ruled Google's conduct qualified as a form of leveraging in breach of Article 102(b) TFEU. Google breached Article 102 TFEU in that (i) it leveraged its market power in one market to expand to an adjacent market; (ii) with the potential to foreclose competition in the adjacent market; and (iii) without any objective justification for its conduct.<sup>157</sup> To the extent that Apple has similarly favored the presentation of its own apps in the App Store, its conduct is likely to be in violation of Article 102 TFEU.

## V. BALANCING AGAINST POTENTIAL PROCOMPETITIVE JUSTIFICATIONS

Both tying and monopolization cases consider efficiency justifications.<sup>158</sup> Courts often conduct a balancing test that weighs the harms and benefits of the conduct at issue.<sup>159</sup> Given the complexity of balancing two often highly uncertain and complicated effects, courts employ the Less Restrictive Alternative (LRA) test to simplify the calculus.<sup>160</sup> The LRA test asks whether an alternative exists that achieves the beneficial goal equally well but with less harm.<sup>161</sup>

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<sup>157</sup> *Commission Decision, Case AT.39740 – Google Search (Shopping)*, EUROPEAN COMM’N (June 27, 2017), [https://ec.europa.eu/competition/antitrust/cases/dec\\_docs/39740/39740\\_14996\\_3.pdf](https://ec.europa.eu/competition/antitrust/cases/dec_docs/39740/39740_14996_3.pdf).

<sup>158</sup> See *Int'l Salt Co. v. United States*, 332 U.S. 392, 397-98 (1947) (considering and ultimately rejecting a goodwill defense); *Viamedia, Inc. v. Comcast Corp.*, 951 F.3d 429, 461 (7th Cir. 2020) (supporting a “balancing” test in monopolistic refusal-to-deal cases); *Breaux Bros. Farms v. Teche Sugar Co.*, 21 F.3d 83, 89 (5th Cir. 1994) (finding “procompetitive effect . . . is relevant” for tying analysis); *Metrix Warehouse v. Daimler-Benz A.G.*, 828 F.2d 1033, 1035 (4th Cir. 1987) (considering and rejecting a quality-control defense in finding illegal tying).

<sup>159</sup> See, e.g., *Eastman Kodak Co. v. Image Tech. Servs., Inc.*, 504 U.S. 451, 486 (remanding on whether procompetitive effects “outweighed” anticompetitive effects).

<sup>160</sup> See C. Scott Hemphill, *Less Restrictive Alternatives in Antitrust Law*, 116 COLUM. L. REV. 927, 937, 947-55 (2016).

<sup>161</sup> *Id.* at 937.

**IAP tie.** Apple proponents have claimed that only if Apple controls the in-app transaction process can it ensure payment safety and provide a smooth experience.<sup>162</sup> What's more, Apple would then use the proceeds from its 30% tax to promote third-party apps and to support app quality control, development, and distribution. Under this sanguine view, the 30% tax offers integration benefits to both users and developers that are sufficient to offset the harms of higher prices, diminished competition, and suppressed innovation. Applying the balancing and LRA tests suggests, however, that these proclamations ring hollow.

Some easy balancing for certain key apps exposes the weakness of several of these claims. Apple's promotions are clearly inadequate compensation for the 30% tax imposed on prominent apps, such as Netflix and Spotify, that have forged distinct brand identities—they are big enough to attract customers themselves without Apple's help. In fact, prominent app developers have made clear that they would decline Apple's services if given a choice.<sup>163</sup> Moreover, putative security and support benefits offered in exchange for the 30% tax mean little if the extortionate tax threatens the survival of the app in the first place. Small businesses and app studios as well as thin-margin (e.g., subscription) apps are particularly vulnerable.<sup>164</sup>

The supposed efficiency justifications crumble further in the face of three LRAs. First, Apple could actually increase its profits by offering lower fees to the prominent apps, and that it has not done so indicates anticompetitive intent probative of harm. These apps have generated billions of dollars in revenue for Apple—Netflix, for example, was the top grossing app on iOS

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<sup>162</sup> See *Online Platforms and Market Power, Part 2: Innovation and Entrepreneurship: Hearing Before the Subcomm. on Antitrust, Commercial, and Admin. Law of the H. Judiciary Comm.*, 115th Cong. (2018) (statement of Kyle Andeer, Vice President, Corporate Law, Apple); *Addressing Spotify's Claims*, APPLE (Mar. 14, 2019), <https://www.apple.com/newsroom/2019/03/addressing-spotifys-claims>.

<sup>163</sup> For example, Epic Games, the creator of Fortnite, pulled out of the Google Play store and explicitly said it would have done the same for the iOS version of the battle royale game but for Apple's restrictions. See Liz Lanier, 'Fortnite' Avoiding Google Play Store's 30% Cut on Android Version, VARIETY (Aug. 4, 2018), [variety.com/2018/gaming/news/fortnite-avoiding-google-play-stores-30-cut-on-android-version-1202895335](http://variety.com/2018/gaming/news/fortnite-avoiding-google-play-stores-30-cut-on-android-version-1202895335).

<sup>164</sup> See *supra* notes 48, 54 & 56 and accompanying text.

generating \$853 million in revenue in 2018 just before it exited IAP, which means Apple's 30% share of payments for Netflix services alone amounted to \$256 million in that one year.<sup>165</sup> Requiring a 30% tax that forces major app developers off its payment system seems to make little business sense; Apple would clearly be better off by levying a more acceptable 10% rate on the \$853 million. The fact that Apple's sophisticated management team has chosen to forgo these enormous profits strongly suggests it expects even more gains from restraining these apps.

Second, putative quality control, security, developer support, and promotional efficiencies are not causally related to the IAP tie and are likely to have been provided by Apple even in the absence of the 30% tax associated with the IAP tie. To ensure that the iPhone retains its premium branding, cultivated at great expense, Apple has strong incentives that are *independent* of the use of its IAP system to maintain the quality and security of iPhone apps. Indeed, the Mac App Store remains secure and maintains reasonable quality control by Apple's own account without tying digital goods distribution to the use of its payment system.<sup>166</sup> Similarly, Apple offered quality control, developer support, and app promotions to subscription apps well before it imposed the IAP on them in 2011.<sup>167</sup> Broad-based developer support is a sine qua non for all successful modern software platforms, and such support is routinely offered without an exorbitant 30% tax.<sup>168</sup> In fact, Apple already charges a \$99 annual developer fee for support tools.<sup>169</sup> Promotions are also independently provided through Apple's Search Ads program that advertises apps for a fee when

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<sup>165</sup> Sarah Perez, *Netflix Stops Paying the 'Apple Tax' on Its \$853M in Annual iOS Revenue*, TECHCRUNCH (Dec. 31, 2018), <https://techcrunch.com/2018/12/31/netflix-stops-paying-the-apple-tax-on-its-853m-in-annual-ios-revenue>.

<sup>166</sup> See *Security. Built Right in.*, APPLE, <https://www.apple.com/macos/security>.

<sup>167</sup> See sources cited *supra* note 63.

<sup>168</sup> See *A New Microsoft Store Revenue Share Is Coming*, MICROSOFT (May 7, 2018), <https://blogs.windows.com/windowsdeveloper/2018/05/07/a-new-microsoft-store-revenue-share-is-coming> (charging a mere 5 percent); *Microsoft Developer*, MICROSOFT, <https://developer.microsoft.com/en-us> (offering support tools).

<sup>169</sup> See *Program Membership Details*, APPLE DEVELOPER, [developer.apple.com/programs/whats-included](http://developer.apple.com/programs/whats-included).

users search for apps, which is expected to generate \$2 billion in 2020.<sup>170</sup> It is thus disingenuous to claim that Apple would not be able to provide these efficiencies without imposing the 30% tax.

Third, the supposed security and ease of use benefits are achievable by giving users and developers choice—they will adopt Apple’s IAP if it does provide value. As the Fourth Circuit has held, if security is the concern, the tying firm “could have required its dealers [or developers in Apple’s case] to inform their customers” of the alternative payment mechanism developers offer and their associated security risks (as Apple already does with Mac apps from third-party sources).<sup>171</sup> Citing the Supreme Court, the Fourth Circuit observed that “any intrinsic superiority of the tied product would convince freely choosing buyers to select it over others, anyway.”<sup>172</sup> This unchosen LRA based on providing information and preserving buyer choice, rather than a forced tie, offers much of the claimed benefit while remaining substantially less restrictive.

***Self-preferencing.*** Whatever quality control or privacy benefits Apple’s restrictions on third-party promotions and data access could provide, users should similarly have the choice. If prominent promotions for Apple apps help launch new products users desire, similar openings should be available to third-party developers (e.g., by auction) who will pay for such services to the extent their apps are valued by users and thus profitable.

## CONCLUSION

Apple has abused its mobile platform dominance in forcing the IAP tie, excluding competitors, and favoring its own apps. In doing so, it has distorted competition both on the iOS

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<sup>170</sup> See Lauren Feiner, *Apple’s App Store Ads Could Be a \$2 Billion Business by 2020, Bernstein Analyst Predicts*, CNBC (Oct. 22, 2018), <https://www.cnbc.com/2018/10/22/apple-app-store-ads-to-be-2-billion-business-by-2020.html>.

<sup>171</sup> Metrix Warehouse v. Daimler-Benz A.G., 828 F.2d 1033, 1041 (4th Cir. 1987).

<sup>172</sup> *Id.* (internal quotation marks omitted) (citing *Times Picayune Publ’g Co. v. United States*, 345 U.S. 594, 605 (1953)).

platform and between mobile platforms, creating considerable harm to consumers worth tens of billions of dollars without nearly commensurate efficiencies. Apple's conduct thus constitutes illegal tying and monopolization in violation of antitrust law.

## FIGURES & TABLES

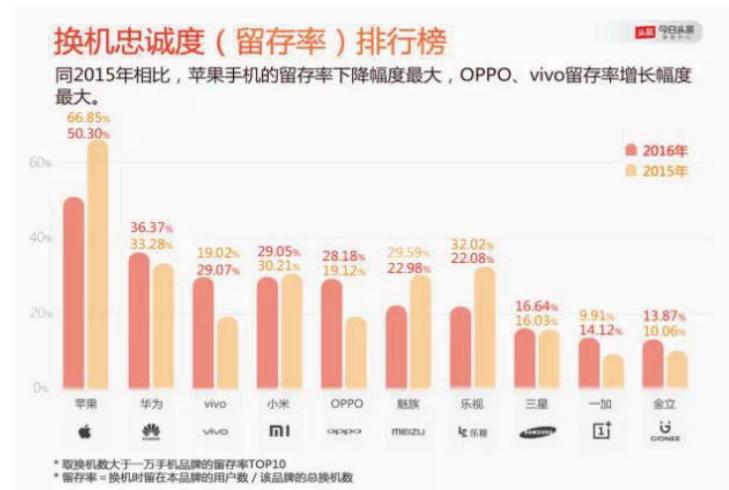


Chart 1: Customer Retention (twelve months ending in each quarter)

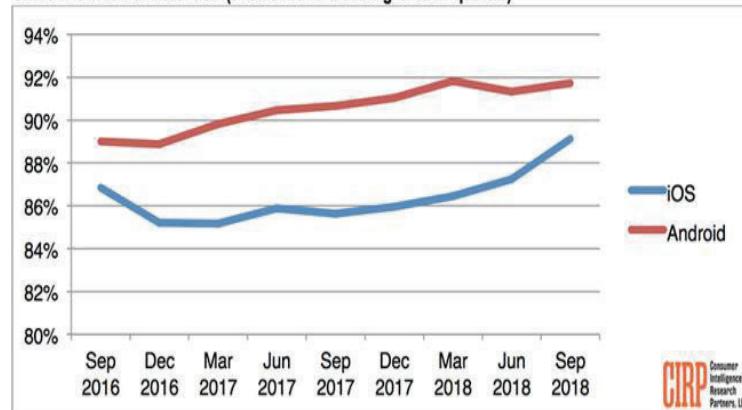


Figure 1: iOS retention rate in China vs. U.S.

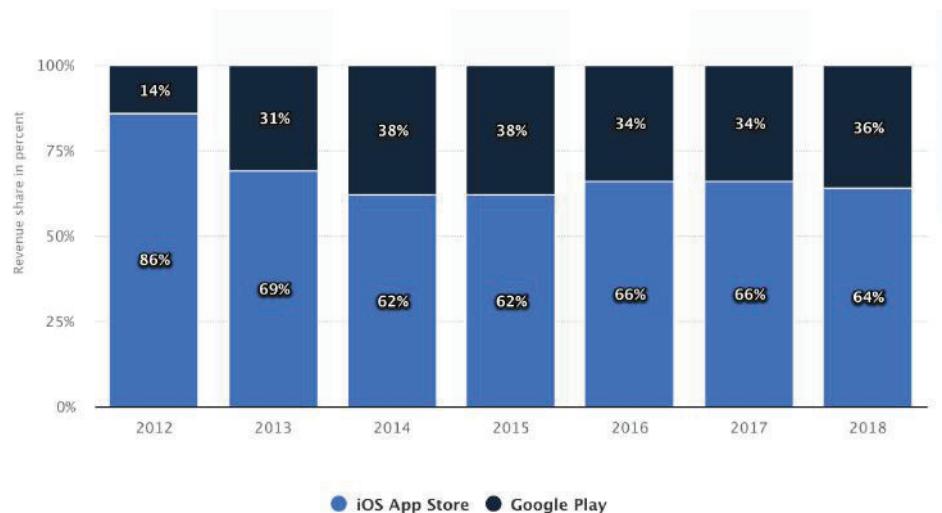


Figure 2: Worldwide Consumer Mobile Spending Market Shares<sup>173</sup>

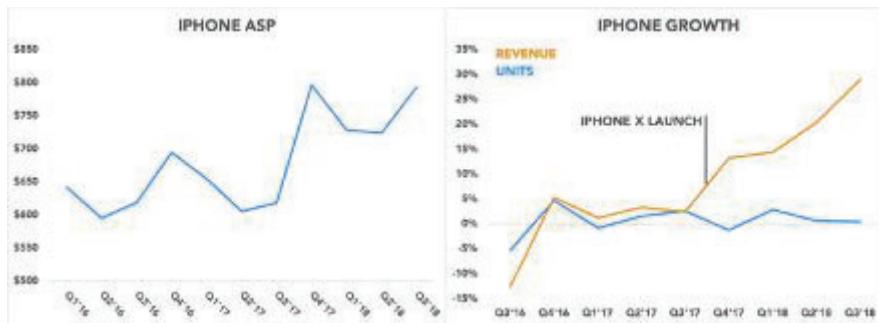


Figure 3: iPhone Average Selling Price, Sales Volume, and Revenue

<sup>173</sup> Global Mobile App Sales Revenue Distribution Between the Apple App Store and Google Play from 2012 to 2018, STATISTA (June 2019), <https://www.statista.com/statistics/259510/revenue-distribution-between-the-apple-app-store-and-google-play>.

	Spotify	Pandora	Tidal	Youtube Music	Apple Music
iOS	\$12.99*	\$12.99	\$12.99	\$12.99	\$9.99
Android	\$9.99	\$9.99	\$9.99	\$9.99	N/A

\*Before Spotify decided to stop allowing in-app subscriptions on iOS altogether in 2016.

Table 1: Music Streaming Subscription Prices on iOS vs. Android

Robert Roberts, M.D., FRCPC, MACC, FAHA, FRSC, FCAHS, FESC, LLD (Hon.)  
Director of Cardiovascular Genomics and Genetics, Dignity Health St. Joseph's Hospital and Medical Center  
Professor of Medicine, University of Arizona, College of Medicine Phoenix  
Chair, ISCTR  
Scientist Emeritus and Advisor, University of Ottawa Heart Institute  
Past President & CEO, University of Ottawa Heart Institute  
Founding Director, Ruddy Canadian Cardiovascular Genetics Centre  
Adjunct Professor, Baylor College of Medicine

CellularREDACTED  
Email: [REDACTED](#)

Dear Apple,

I am writing you regarding the Coronavirus Reporter app, which has been awaiting approval for nearly two weeks in your App Store. My understanding is the App is being held until it is endorsed by an institution with "appropriate credentials in health care," pursuant to the new Apple Developer guidelines regarding COVID-19.

I am the Director of the Cardiovascular Genomics and Genetics at Dignity Health and Professor of Medicine at University of Arizona College of Medicine Phoenix. My CV is attached in a form of a short bio as well as the complete bio and publications.

I understand a similar app has been released. We feel that our app will provide appropriate information and will be updated on a regular basis, taking into account responses we receive on the app. We will review the epidemiological data gathered by this app in conjunction with academic physician scientists at my own institution and elsewhere, and will continually adapt the app based upon scientific and medical advice from experts. This app has considerable potential to advance medical understanding of the situation, and foster information exchange amongst all stakeholders, most importantly, the Apple users themselves.

In short, this project is being properly overseen, and we hope it will be released immediately to enable it to reach its potential.

Thank you for your attention to this matter. Please do not hesitate to contact me if further information is necessary.

Regards,

A handwritten signature in blue ink that reads "Robert Roberts MD". The signature is fluid and cursive, with "Robert" on the left and "Roberts MD" on the right.

Robert Roberts, MD, MACC, FRSC, FAHA, FESC, FRCPC, LLD (Hon.)



**Robert Roberts, MD, FRCPC, FRS, MACC, FAHA, FESC, FRSC, LLD (Hon.)**

**Professor, University of Arizona College of Medicine - Phoenix**

**Director of Cardiovascular Genomics and Genetics, Dignity Health St. Joseph's Hospital and Medical Center- Phoenix**

**Chair, International Society Cardiovascular Translational Research (ISCTR)**

Adjunct Professor, Baylor College of Medicine

Scientist Emeritus and Advisor, University of Ottawa Heart Institute

Past President and CEO, University of Ottawa Heart Institute

Founding Director, Ruddy Canadian Cardiovascular Genetics Centre

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Dr. Roberts completed his undergraduate (Memorial University), Medical school (Dalhousie University) and training in cardiology (University of Toronto) in Canada. He proceeded on scholarship to the University of California and was recruited to Washington University in St. Louis as Director of the Coronary Care unit (1973-1982). In 1982 he was recruited to Baylor College of Medicine in Houston as Chief of Cardiology where he served for 23 years. He was recruited as President and CEO of the University of Ottawa Heart Institute (UOHI) where he completed two 5 year terms (2004 to 2014).

He developed the first quantitative assay for MBCK, followed by a radioimmunoassay. MBCK was used as the gold standard to diagnose heart attacks for three decades. He discovered several genes for the familial cardiomyopathies, including the first gene for atrial fibrillation, WPW Syndrome and CAD (9p21) along with co-discoverer of over 90 genetic risk variants predisposing to CAD and 95 genetic variants regulating plasma lipids. As a pioneer of molecular cardiology, he edited the first textbook on molecular cardiology. Dr. Roberts is recognized as a leader in the research and practice of cardiology worldwide. Dr. Roberts for 25 years has been associate Editor of Hurst The Heart, a leading textbook in cardiology. Dr. Roberts is Editor in Chief of Current Opinion in Cardiology, Chief Guest Editor of JACC BTS, Genomics Section Editor for JACC, Associate Editor of Cardiology Today and on the editorial board of 18 other journals. In recognition of his scientific contributions (over 900 publications) Dr. Roberts has received several prestigious awards:

- Fellow of the Academy of Science of the Royal Society of Canada (2013)
- Distinguished Scientist Award from the American College of Cardiology (1998)
- Canadian Cardiovascular Society Research Achievement Award (2012)
- McLaughlin Medal from the Royal Society of Canada (2008)
- Award of Meritorious Achievement from American Heart Association (2001)
- Robert Beamish Leadership Award from ICSS Winnipeg (2005)
- Albrecht Fleckenstein Memorial Award from the International Academy of Cardiology (2008)
- Distinguished Fellowship Award from the International Academy of Cardiology (2012)
- Citation for Highly Cited Researcher from ISI Thomson Scientific (2002)
- Awarded Best of What's New by Popular Science, New York (1994)
- First Prize: International Film Festival, NY for video "Unlocking the Secrets of the Heart" (1992)

He has held several leadership roles: member NHLBI Council, American Heart Association (Board of Trustees, President Elect), the American College of Cardiology (Board of Trustees and Chair of Annual Scientific Session). He has served on several prestigious advisory boards, including: Gairdner Foundation; The Fields Institute for Research in Mathematical Sciences; Ontario Genomics Institute,

Fondation Leducq of Paris and NIH-ACC Inter-Society Coordinating Committee for genomics and genetics.

Dr. Roberts has had a distinguished and prolific international career as a Cardiologist, Educator, Scientist and spokesman having lectured throughout the world including several prestigious presentations: Plenary addresses of the American College of Cardiology, (Simon Dack Lectureship), the Japanese College of Cardiology, the Japanese College of Circulation, the Australian and New Zealand Heart Association (Hall Lecture), the Canadian Cardiovascular Society, Indonesian Heart Society and the International Academy of Cardiology. In 2013 he addressed The Royal Canadian Institute for the advancement of science.

Under Dr. Roberts leadership, the University of Ottawa Heart Institute (UOHI) flourished, patient wait times decreased from 6 months to 3 weeks, diagnostic and therapeutic laboratories were added, 50 additional physicians and scientists were recruited, with an independent patient satisfaction of 98.5 (best in Ontario). He founded and directed The Ruddy Canadian Cardiovascular Genetics Centre, and established The Research Methods Centre. The research endowment tripled from 15 million to 55 million as did competitive grant funding. Under his leadership UOHI achieved world recognition for its research impact being ranked by SIR SCHIMAGO to be in the top 2% of 3,043 institutions worldwide. The future was secured with approval and funding for a \$200 million expansion to the institute which was initiated in 2013 and officially opened March 23, 2018.

## Coronavirus Reporter (Wyoming) Officer Minutes

After the originating Complaint was filed on January 19<sup>th</sup> 2021 in the New Hampshire District, CNBC's chief Apple reporter contacted the Chief Legal Officer on same day, requesting the identity of Coronavirus Reporter's Chief Medical Officer.

A responsive email sent Monday January 25 2021 agreed to an interview. The interview between Dr Robert Roberts and CNBC Apple correspondant was scheduled and took place on January 28<sup>th</sup> 2021 at 1PM EST.

Present on the call were Robert Roberts, Keith Mathews, and CNBC's Apple correspondant. The conference call duration was approximately forty minutes.

Dr Roberts was asked to provide an opening statement. He described the formation of his Coronavirus Reporter app team having the right combination of a seasoned medical researcher, a front line ER physician, and a computer scientist app developer.

He described his app as a large-scale epidemiological study and screening system, meant to harness and distribute pandemic data. He explained his background in medical screening and how it was particularly relevant for a coronavirus app. He articulated how he developed the MBCK gold-standard test, which has saved countless lives and persisted over three decades as the primary test for heart attacks. He remarked that the newer replacement tests, called troponins, are also based on his MBCK work. He mentioned other career discoveries such as genes for heart disease, all of which are detailed in the CV he provided to Apple last March.

Dr Roberts was "taken aback," in his own words, when Apple refused the app for lacking deep-rooted medical credentials. Dr Roberts pointed out his peer-reviewed credentials and recognitions, as committee member for the Nobel prize Fields Medal, Award of Meritorious Achievement by the American Heart Association. He raised the appropriate question - If he didn't have deep credentials, who did?

Dr Roberts suggested a comparison to "startups" dating back through the Industrial Revolution that were comprised by a single individual and/or small team. He stated that if Apple feels startups cannot possess the deep-rooted medical credentials needed to solve humanities problems, then Apple is contrary to the evidence of history. He offered anecdotally Fleming's discovery of penicillin.

When asked what are the ramifications of Apple's refusal to publish his app, Roberts' unambiguously stated that it was a major loss to science and society. An important phase of COVID trajectory was not captured because of Apple's decision. Roberts stated that though he had been prepared to ramp up epidemiological studies, when Apple made their determination, he assumed it was a lost cause and moved on to other COVID projects.

CNBC asked for specific examples of potential losses. Roberts replied that in the case of long-term COVID damage to the cardiovascular system, much remains unknown. He felt the App would have provided a meaningful platform for him to focus on his passion, cardiovascular health, and derive world-class research, as he has done without pause during his entire career.

CNBC asked what Roberts felt should happen from his litigation. Roberts replied that, though he isn't a lawyer, he doesn't feel Apple should be allowed to do what they did.

Entered by Chief Legal Officer



## Robert Roberts

**B.Sc., M.D., FRCPC, FRSM, FACP, FESC, FAHA, FISHR, MACC, LLD (Hon.), FRSC.  
Professor of Medicine, University of Arizona College of Medicine – Phoenix  
Chair, International Society of Cardiovascular Translational Research (ISCTR)  
Director of Cardiovascular Genetics and Genomics, Dignity Health, St. Joseph's Hospital & Medical Center**

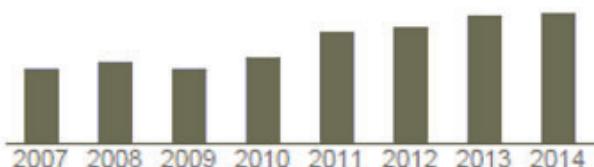
Past President, and CEO, University of Ottawa Heart Institute, Ottawa, Ontario, Canada  
Founding Director, John and Jennifer Ruddy Canadian Cardiovascular Genetics Centre, Ottawa, Ontario,  
Past President, CEO and Chief Scientific Officer, Ottawa Heart Institute Research Corporation  
Scientist Emeritus and Advisor, University of Ottawa Heart Institute  
Adjunct Professor of Medicine, Baylor College of Medicine

### CONTACT INFORMATION

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**Dr. Robert Roberts**  
550 East Van Buren St.  
Phoenix, AZ 85004  
Citizen: United States and Canada  
Telephone: 602-827-2651  
Email: rroberts2@email.arizona.edu

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## **EDUCATION (MEDICAL)**

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Licensee Certificate #52653, State of Arizona, USA (2017)  
Master, American College of Cardiology (2007 March)  
Fellow of the American Heart Association (2001 October)  
Fellow, International Society for Heart Research (2001)  
Fellow, European Society of Cardiology (1998)  
Licensee Certificate #G-6381, State of Texas, USA (1984)  
Fellow, American College of Cardiology (1976 March)  
Fellow, American College of Physicians (1976 March)  
Diplomate, Subspecialty Board in Cardiovascular Disease, American Board of Internal Medicine (USA) (1975)  
Licensee Certificate #35201, State of Missouri, USA, (1974)  
Research Fellow, University of California, San Diego (1972-1973, June)  
Diplomate, American Board of Internal Medicine, USA (1972)  
Fellow, Ontario Heart Foundation, University of Toronto, Ontario, Canada (1971 December)  
Fellow, Royal College of Physicians of Canada (1971 August)  
Certified, Specialist in Internal Medicine, Canada (1971)  
Assistant Chief Resident, Toronto General Hospital, Toronto, Ontario, Canada (1971 June)  
Fellow in Cardiology, Toronto Western Hospital, University of Toronto, Toronto Ontario, Canada (1970 June)  
Licensee Certificate #21784, Ontario College of Physicians and Surgeons, Ontario, Canada (1969)  
Senior Resident in Medicine, Sunnybrook Hospital University of Toronto, Toronto, Ontario, Canada (1969 June)  
Junior Resident in Medicine, St John's General Hospital, St John's, Newfoundland, Canada (1967 May)  
Intern, Victoria General Hospital, Halifax, Nova Scotia, Canada (1966 May)  
Licensee, Newfoundland Medical Board, Newfoundland, Canada (1966)  
Medical Doctor, Dalhousie University (1965 June)  
Bachelor of Science, Memorial University of Newfoundland (1961 June)

## **PROFESSIONAL EXPERIENCE**

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2019-present	Director of Cardiovascular Genetics and Genomics, Dignity Health, St. Joseph's Hospital & Medical Center, Phoenix, Arizona
2015-present	Chair, International Society of Cardiovascular Translational Research, University of Arizona College of Medicine – Phoenix, Phoenix, Arizona
2015-present	Professor of Medicine, University of Arizona College of Medicine – Phoenix, Phoenix, Arizona
2004-2014	President and CEO, University of Ottawa Heart Institute, Ottawa, Ontario, Canada
2004- 2012	Chief Scientific Officer, University of Ottawa Heart Institute, Ottawa, Ontario, Canada
2004-2014	Director, John & Jennifer Ruddy Canadian Cardiovascular Genetics Centre, Ottawa ON Canada
2004-2014	Professor of Medicine, University of Ottawa, Ottawa, Ontario, Canada
2000-present	Adjunct Professor of Medicine, Baylor College of Medicine, Houston, Texas
1999-2004	Professor of Molecular Physiology and Biophysics, Houston, Texas
1990-2004	Professor of Cell Biology, Baylor College of Medicine, Houston, Texas
1994-2004	Endowed Professorship, Don W. Chapman Professor of Medicine
1982-2004	Professor of Medicine, Baylor College of Medicine, Houston, Texas
1982-2004	Chief of Cardiology, Baylor College of Medicine, and The Methodist Hospital, Houston, Texas
1982-2004	Director of the Myocardial Infarction Diagnostic Laboratory, Houston, Texas
1998	NASA Lead Cardiology Consultant for the STS-95 John Glenn Space Flight, Houston, Texas
1982-1987	Consultant and Scientific Collaborator, NASA
1977-1982	Associate Professor of Medicine, Washington University School of Medicine, St Louis, Missouri
1975-1982	Consultant in Cardiology, St Louis Children's Hospital, St Louis, Missouri
1974-1982	Director, Cardiac Care Unit, Barnes Hospital, St Louis, Missouri
1973-1977	Assistant Professor of Medicine, Washington University School of Medicine, St Louis, Missouri
1973-1974	Assistant Director, Cardiac Care Unit, Barnes Hospital, St Louis, Missouri
1972-1973	Canadian Heart Foundation Fellowship, Assistant Research Cardiologist, University Hospital, University of California, San Diego, California
1967-1968	General Practice, Old Perlican Hospital, Old Perlican, Newfoundland, Canada

## **Common Spirit-Dignity Activities**

Director of Cardiovascular Genomics and Genetics for Dignity Healthcare System. (2019-present).  
Committee Member for Heart and Vascular Institute- St. Joe's Hospital and Medical Center. (2019-present).  
Executive Member for Heart and Vascular Institute- St. Joe's Hospital and Medical Center. (2019-present).

## **MANAGED HEALTH CARE EXPERIENCE**

Negotiated a capitated contract with MacGregor Medical Service (Prudential) for The Section of Cardiology, Baylor College of Medicine (1995–1996) Contract renewed (1996–2002)

## **UNIVERSITY OF ARIZONA COMMITTEES AND ACTIVITIES**

Member, Research Senate Committee (2018-present)  
Member, Research Symposium Steering Committee, (2018-2019)  
Chair, Development of the syllabus for the online ISCTR course, Cardiovascular Translational Science and Medicine (2015-present)  
Member of the Committee for Review of the Valley Research Partnership P1,P2 Grants (2019)  
College of Medicine – Phoenix Appointments, Promotions and Tenure Committee (2017-present)  
Chair of the Committee for Review of the Valley Research Partnership P1 Grants (2018)  
Research Strategic Planning Committee (2017)  
Member of the Committee for review of P1, P2 and P3 Valley Research Partnership Grant Applications (2016)  
Recruitment Committee of Faculty for Cardiology at Banner University Medical Center (2016-2018)  
Recruitment Committee of Faculty for Basic Medical Science (2015- 2019)  
Mentor, Leading and Inspiring Faculty Trajectories (2017-2018)  
Member, Search Committee for Associate Dean of Finance (2017-2018)

## **RESEARCH RELATED TRAINING**

Division 5: Are you Compliant? Ottawa Hospital Research Institute [2013 March 20]  
GCP Training, Pfizer [2009 Nov 30]  
TCPS2, Introductory Tutorial of the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans. Certificate of Completion [2011 Oct 25]

## **RESEARCH FUNDING**

Co-Principal Investigator, Canadian Foundation for Innovation, TIMEX, \$50 million (2009-2014)  
Principal Investigator, Canadian Foundation for Innovation, Development of a Cardiovascular Genetics Centre,4 \$11.5 Million (2008-2013)  
Co-Investigator, National Networks of Centers of Excellence Operating Grant, CANNeCTIN, \$19 million (2007-2012)  
Principal Investigator, Canadian Institutes of Health Research, Genome-wide Scan to Identify Coronary Artery Disease Genes \$561,560 (2007-2012)  
Principal Investigator, Agilent Technologies, \$50,000 (2006-2007)  
Principal Investigator, National Heart, Lung & Blood Institute, Cardiology Research Training Grant, \$2,550,000, (2004–2009)  
Principal Investigator, National Heart, Lung, and Blood Institute, INRSA, Research Training Grant in Molecular Cardiology Baylor College of Medicine \$2,400,000 (1990–95; Renewed 1995–99; 1999–2004; 2004–2009)  
Principal Investigator, National Heart, Lung, and Blood Institute, Specialized Center of Research in Heart Failure (SCOR), Baylor College of Medicine \$6,450,000 (1990-1994; Renewed 1995–1999; 2000–2004)  
Principal Investigator, National Heart, Lung and Blood Institute, Thrombolysis in Myocardial Infarction (TIMI), Baylor College of Medicine (1983–1996)  
Co-Principal Investigator, National Heart, Lung, and Blood Institute, Thrombolysis in Myocardial Infarction TIMI-4 Trial, Baylor College of Medicine (1984–1994)  
Program Director, American Heart Association/Bugher Foundation Center for Molecular Biology of the Cardiovascular System, Baylor College of Medicine (1986–1993)  
Principal Investigator and Director of CK Core Laboratory, Sponsored by Marion Laboratories, Diltiazem Reinfarction Study (DRS), Baylor College of Medicine (1982–1985)  
Principal Investigator and Director of CK Core Laboratory, Sponsored by National Heart, Lung & Blood Institute, Multicentered Study on the Limitation of Infarct Size (MILIS), Washington University and Baylor College of Medicine (1978–1984)  
Principal Investigator and Director of CK Core Laboratory, Sponsored by Pfizer Pharmaceuticals, Multicentered Study "Nifedipine Angina Myocardial Infarction Study" (NAMIS), Washington University, St Louis, Missouri (1979–1982)  
Principal Investigator, Collaborative Clinical Trial of Therapy to Protect Ischemic Myocardium, Washington University, St Louis, Missouri (1978–1982)  
Co- Investigator, National Heart, Lung, and Blood Institute, Specialized Center of Research in Ischemic Heart Disease (SCOR), , Washington University, St Louis, 5,450,000 (1974-1979; Renewed 1979–1984)  
Co- Investigator, National Heart, Lung & Blood Institute, Cardiology Research Training Grant, \$2,550,000, (1974–1979) Washington University, St Louis, (; Renewed 1979–1984)

## **FELLOWSHIPS / SOCIETIES / ASSOCIATION MEMBERSHIPS**

Master, American College of Cardiology  
Fellow of the American Heart Association (2001 October)  
Fellow, American College of Physicians  
Fellow, Royal Society of Canada

Fellow, International Academy of Cardiovascular Sciences, 2002  
Fellow, Royal College of Physicians and Surgeons of Canada  
Fellow, Royal Society of Medicine (London)  
Fellow, Council on Arteriosclerosis  
Fellow, Council on Clinical Cardiology Association of American Physicians  
Fellow of the European Society of Cardiology  
Fellow, International Society for Heart Research (ISHR) & Founding Member of ISHR  
Member, Ontario Medical Association  
Member, Canadian Cardiovascular Society  
Member, Canadian Medical Association  
Member, Association of University Cardiologists  
Member, Association of Professors of Cardiology  
American Association for the Advancement of Science  
American Society of Human Genetics  
American Society for Clinical Investigation  
American Federation for Clinical Research  
American Heart Association  
American Physiology Society  
American Society of Internal Medicine  
Harris County Medical Society  
Heart Failure Society of America  
Houston Cardiology Society  
Society for Experimental Biology and Medicine  
Texas Club of Cardiologists  
Honorary Member, Musser-Burch Society  
Member, Southern Medical Association

## **AWARDS**

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Fellow of the Academy of Science of the Royal Society of Canada (2013)  
Outstanding Speaker Award, American Association for Clinical Chemistry (2012 June)  
Research Achievement Award 2012, Canadian Cardiovascular Society, Canadian Cardiovascular Congress 2012, Toronto  
Distinguished Fellowship Award 2012, International Academy of Cardiology, 17th World Congress on Heart Disease  
Annual Scientific Sessions 2012 Toronto, ON, Canada (2012 Jul 27)  
Albrecht Fleckenstein Memorial Award, International Academy of Cardiology (2008 July 27)  
McLaughlin Medal of the Royal Society of Canada, In Recognition of Important Research in the Medical Sciences  
(2008 Nov 15)  
Robert Beamish Leadership Award, Institute of Cardiovascular Sciences Symposium, Winnipeg, Manitoba (2005 Sep 30)  
Lifetime Achievement Award, Memorial University (2004 Oct 27)  
Citation for Highly Cited Researcher, ISI Thomson Scientific (2002)  
Award of Meritorious Achievement, American Heart Association (2001)  
Alumnus of the Year Award, Dalhousie University (2001 Oct 11)  
Medal of Merit, International Society for Heart Research, Winnipeg, Canada (2001)  
Five Fellows from Dr. Roberts' laboratory won 1st place for the ACC Young Investigator Award for Research in  
Molecular and Cellular Cardiology (1995–1999)  
Distinguished Scientist Award of the American College of Cardiology (1998)  
Award for Excellence in Research, Baylor College of Medicine (1996–1997, 1997–1998)  
Irving S Cutter Award for Scientific Achievement *for outstanding contributions to the arts and science of medicine*, Phi  
Rho Sigma Fraternity (1994)  
Popular Science, Best of What's New in 1994 Award for MB CK Isoform Laboratory's Heart Attack Diagnostic Test New  
York, NY (1994)  
A Video entitled "Molecular Cardiology: Unlocking the Secrets of the Heart", 1st prize, Educational Section, International  
Film Festival, New York, NY (1992)  
Canadian Heart Foundation Scholarship (1971–1973)  
Resident of the Year Award, Memorial University of Newfoundland, Canada (1966–1967)

## **HONOURS & DISTINCTIONS**

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Leading Physicians of the World (2017-present)  
Top Doctor in Phoenix, AZ, International Association of HealthCare Professionals (IAHCP) (2017-present)  
Member of the Board, Friends of the Canadian Institute of Health Sciences (2015-2018)  
Doctor of Laws *honoris causa* Dalhousie University, Canada (2012 October)  
Board of Directors, Ontario Genomics Institute, Toronto, Ontario (2011-2015)  
Medical Advisory Board Member, Gairdner Foundation (2009-2014)  
Board of Directors, Fields Institute of Research in Mathematical Science (2010-2016)  
Director, Board of Trustees, American College of Cardiology (1996-2001)  
Scientific Advisory Committee Member, Fondation Leducq, Paris, France (2009-2014)  
Honorary Member, Committee for Canada Science and Technology Museum Foundation (2009-2013)  
Confrerie des Chevaliers du Tastevin, Grand Sénéchal, Ottawa (2005-2011)  
Master, American College of Cardiology (2007 March)  
Canadian Chair for Plenary Session “New Concepts in Translational Cardiac Research”, International Academy of Cardiology World Congress on Heart Disease (2007)  
Lifetime Membership, Madison Who’s Who (2007)  
Member of the Committee to seek Renewal of the Bugher Foundation Grant, National American Heart Association (2005)  
Chairman, Selection Committee, Interbrew-Baillet Latour Health Prize—2005, Brussels, Belgium (2005)  
Endowed Professorship, Don W Chapman Professor of Medicine (1994-2004)  
Board of Directors, National American Heart Association (1999-2002)  
Member, Association of American Physicians (1987 April)  
“The Best Doctors in America” (1985-2004)  
Member of the Committee, Renewal of the Bugher Foundation Grant, Dallas, National American Heart Association (2000)  
National Registry of Who’s Who in America, Life Member #95999 (1999)  
“The Best Doctors in Texas”, Inside Houston (1998)  
Vice Chairman for Scientific Sessions, National American Heart Association (1996-1997)  
“Who’s Who in Medicine and Healthcare” (1997)  
Roberts Fellowship of Molecular Biology, Baylor College of Medicine (1990)  
Visiting Scientist for Joint US/USSR Symposium on Cardiovascular Biology and Medicine, Suzdal, Russia (1990)  
Speaker for the National Assembly of Delegates in New Orleans, Los Angeles, National American Heart Association (1987)  
Speaker for the National Assembly of Delegates in San Antonio, Texas, National American Heart Association (1987)  
Council Representative for the State of Texas, Council on Clinical Cardiology, American Heart Association American Heart Association Texas Affiliate (1983-1986)  
Member, American Society for Clinical Investigation (1980 April)  
Canadian Heart Foundation Scholarship (1971-1973)

## **RESEARCH CHAIRMANSHIPS & RESEARCH BOARD MEMBERSHIPS**

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Chairman, Multidisciplinary Assessment Committee Grant Review for Canadian Foundation for Innovation (Jan. 2015)  
Inter-Society Coordinating Committee on Practitioner Education in Genomics (ISCC): Representative for American College of Cardiology (see <http://www.genome.gov/27552294> - physician professional societies have recently engaged with the National Human Genome Research Institute (NHGRI) to form ISCC) (2012-2015)  
Board of Directors, Ontario Genomics Institute, Toronto, Ontario (2011-2015)  
Board of Directors, Fields Institute of Research in Mathematical Science (2010-2015)  
Governing Board, International Society of Cardiovascular Translational Research (2010-present)  
Chairman, Governance/Nominating Committee, International Society of Cardiovascular Translational Research, American College of Cardiology (2011-2017)  
Chair, CANNeCTIN–Pharmacogenomics Technology Working Group (2008-present)

Chairman, Data and Safety Monitoring Board of the NHLBI-sponsored, Rule-Out Myocardial Infarction Using Computer Assisted Tomography II (ROMICAT II) Trial, Washington, DC (2008-2012)

CEO Breakfast Board of Advisors, Ottawa (2008-2014)

Member, CardioGram Steering Committee (2007-present)

Member, CARDIoGRAMplusC4D Executive Committee (2008-present)

Chairman, Awards Committee for Grant Reviews of the American College of Cardiology (2003-2006)

Chairman, Research Awards Committee American College of Cardiology (2002-2006)

Chairman, Review Committee, ACC/Merck Fellowship Awards Program (2000-2006)

Co-Chairman of the NIH Symposium on Gene Therapy and Safety, American College of Cardiology (2000)

Chairman of the Advisory Committee for the Merck Fellowship Awards Program, American College of Cardiology (2000-2003)

Chairman, Joint ACC-ESC-AHA Committee Taskforce to Develop Molecular Genetics Curriculum (2000-2002)

Board of Directors, National American Heart Association (1999-2002)

Chair, ACC Task Force 7: Training in Cardiovascular Research (2002)

Chairman, AHA Research Program and Evaluation Committee (1999-2001)

Director, Board of Trustees, American College of Cardiology (1996-2001)

Chair, Training in Cardiovascular Research, American College of Cardiology (2000)

Co-Chairman, NIH Symposium on Gene Therapy and Safety (2000)

Vice-Chairman, RPEC, National American Heart Association (1997-1999)

Vice Chairman, AHA Research Program and Evaluation Committee (1997-1999)

Chairman, Policy Subcommittee American Heart Association (1996-1999)

Chairman, Subcommittee on Scientific Exhibits, National American Heart Association

Board of Directors, American Heart Association (1999 - 2002)

Chairman, Genetics in Hypertrophy and Heart Failure 6th Antwerp – La Jolla – Kyoto Research Conference on Cardiac Function, La Jolla, CA (1998)

Chairman, Present Therapy and Future Prevention of Heart Disease, A symposium prior to ACC, Anaheim Inn at the Park, Anaheim, CA (1997)

Vice Chairman for Scientific Sessions, National American Heart Association (1996-1997)

Chairman, Policy Consensus Conference Committee, National American Heart Association (1996)

Advisory Board Member for the Saudi Heart Association, (1996)

Chairman, National American Heart Association (1994-1995)

Chairman, AHA Cardiovascular Physiology and Pathophysiology Study Committee (1994-1995)

Co-Chairman, Meet the Experts, Molecular Biology for the Clinician, 44th Annual Scientific Sessions of the American College of Cardiology, New Orleans, LA (1995)

Co-Chairman, Cardiovascular Physiology and Pathophysiology Study Committee, Grant-In-Aid Application Reviewer, National American Heart Association (1990-1994)

Chairman, Mini-Course: Molecular Biology and Genetics for the Clinical Cardiologist, 43rd Annual Scientific Sessions of the American College of Cardiology (1994)

Assistant Secretary, Board of Trustees American College of Cardiology (1992-1993)

Board of Trustees, Member American College of Cardiology (1992-1993)

Assistant Secretary, Board of Trustees American College of Cardiology (1992-1993)

Chairman, Hypertrophic Cardiomyopathy: Etiology and Pathophysiologic Mechanisms, First Annual Joint Symposium InterAmerican Society of Cardiology/American College of Cardiology (1992)

Chairman, Mini-Course: Fundamentals of Molecular Cardiology, 41th Annual Scientific Sessions of the American College of Cardiology (1992)

Founding Member, International Society for Heart Research (1992)

Founder Member of the Society Heart and Stroke Foundation of Ontario

Chairman and Organizer, Keystone Symposia on Molecular and Cellular Biology, Molecular Mechanisms of Cardiac Growth and Hypertrophy, Keystone, Colorado (1991)

Chairman, 22nd Annual Louis F Bishop Lecture, American College of Cardiology (1991)

Chairman, ABC's of Molecular Biology, 40th Annual Scientific Sessions of the American College of Cardiology (1991)  
Chairman, Annual Scientific Session Program Committee, American College of Cardiology (1991)  
Chairman, Young Investigators' Awards Committee American College of Cardiology (1988-1990)  
President, Houston Cardiology Society, American Heart Association, Texas Affiliate, Houston Division American Heart Association Texas Affiliate (1988-1989)  
Chairman, the first UCLA Symposium on Molecular Biology of the Cardiovascular System, Keystone, Colorado (1989)  
Vice President/Program Chairman, Houston Cardiology Society, American Heart Association, Texas Affiliate, Houston Division American Heart Association (1987-1988)  
Chairman, Consensus Panel on Early Intervention after Acute Myocardial Infarction, American College of Chest Physicians (1987-1988)  
Secretary/Treasurer, Houston Cardiology Society, American Heart Association, Texas Affiliate, Houston Division American Heart Association Texas Affiliate (1986-1987)  
Chairman, Medical Advisory Committee, Aeromedical Services Program, The Methodist Hospital, Baylor College of Medicine/The Methodist Hospital (1986-1987)  
Board of Directors, American Heart Association, Texas Affiliate, American Heart Association Texas Affiliate (1985-1987)  
Board of Directors Member, American Heart Association, Missouri Affiliate (1982)  
Director, Specialized Centre of Research, NHLBI (1991)  
Chairman of Research Committee, NHLBI (1980-1985)

## **EDITORIAL BOARDS**

Chief Guest Editor, Basic Translational Science-JACC (2015-present)  
Section Editor, Genetics and Genomics, Journal of American College of Cardiology (2014-present)  
Editorial Board, Annals of Global Health (2014-present)  
Editor in Chief, Current Opinion in Cardiology (1995-present)  
Editorial Board, Cardiology Today (1995-present)  
Editorial Board Member, Canadian Journal of Cardiology (2002-2012)  
Editorial Board Member, Global Heart, Senior Advisory Council (2011-present)  
Editorial Board Member, Journal of Clinical and Experimental Cardiology (2011-present)  
Editorial Board Member, Journal of International Association for Biological and Biomedical Science Advisory Board (2011-2012)  
Editorial Board Member, Journal of Geriatric Cardiology (2009-2012)  
Editorial Board Member, Cardiology (2002-2017)  
Editorial Board Member, Coronary Artery Disease (1990-2013)  
Editorial Board Member, World Journal of Cardiology (2009-2012)  
Editorial Board Member, Genomic Insights (2008-2012)  
Editorial Board Member, American Heart Hospital Journal (2007-2013)  
Section Editor, Molecular Cardiology, (1999-present)  
Editorial Board Member, Journal of Clinical and Basic Cardiology (1998-present)  
Section Editor, Cardiology in Review (1997-2000)  
Editor, Section 13: Basic Science and Molecular Cardiology, Adult Clinical Cardiology Self-Assessment Program, American College of Cardiology (1994-2001)  
Editorial Board Member, Journal of Cardiovascular Risk (1993-1999)  
Editorial Board Member, Journal of the Saudi Heart Association (1992-2000)  
Editor, Clinical Challenges in Acute Myocardial Infarction (1990-1994)  
Editorial Board Member, Assistant Editor, Clinical Cardiology (1988-present)  
Editorial Board Member, Myocardium: Studies in the Evaluation of Perfusion and Function, (1988-1995)  
Editorial Board Member, American Journal of Cardiology (1982-present)  
Editorial Board Member, Circulation (1981-1993)  
Editorial Board Member, Herz (1980-1988)  
Editor, Heart Failure Reviews (1996-2008)  
Editorial Board Member, Journal of Molecular and Cellular Cardiology (1998-2007)  
Editorial Board Member, Journal of Cardiovascular Translational Research (2007-2010)

Editorial Board Member, Journal of the American College of Cardiology (2001-2005)  
Editorial Board Member, Circulation, Consulting Editor (1993-2004)  
Editorial Board Member, Journal of The Royal Medical Services–International Advisory Board (1999)  
Editorial Board Member, Journal of Clinical and Experimental Cardiology (1998)  
Editorial Board Member, Biochemical Medicine and Metabolic Biology (1991-1996)  
Editor, Cardiology (1990-1995)  
Editor, Age of Reperfusion, McGraw–Hill Healthcare Group, (1989-1994)  
Editorial Board Member, ACCEL, American College of Cardiology (1985-1992)  
Editorial Board Member, Cardiovascular Drugs and Therapy (1989-1991)  
Editor, Milestones in Medicine, American Medical Video, Inc. (1986-1991)  
Editor, Baylor Cardiology Series (1988-1990)  
Editorial Board Member, Heart & Lung (1984-1990)  
Associate Editor, Archives of Medical Science  
Associate Editor, Cardiology Today (1983-1989)  
Editorial Board Member, Journal of Critical Illness, Cardiology Video Edition (1987-1988)  
Editorial Task Force, American Heart Association, Texas Affiliate, Houston Chapter American Heart Association Editorial Board Member, Chest (1982-1987)  
Editorial Board Member, Journal of the American College of Cardiology (1982-1985)  
Assistant Editor First American–Russian Conference on Cardiac Metabolism, Ponte Vedra, Florida (1974)

## **RESEARCH ADVISORY COMMITTEES**

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Reviewer for the European Society of Cardiology (2017-present)  
Member, National Advisory Board, Michigan Frankel Cardiovascular Center (2015 -2020)  
Member, External Review, Population Health Research Institute (PHRI) McMaster University (2014 Jun 6)  
Member, Search Committee for Editor of new JACC journal, Basic Translational Research (2015)  
Member, External Research Grant Review Panel, Fonadation Leducq, Edinburg Scotland (2014 Jun)  
Member, Impact Review Panel, 2014 Margolese Heart & Brain Disorders Research Awards, University of British Columbia (2014 Jun)  
Member, External Research Grant Review Panel, Fondation Leducq, St. Helena, Napa Valley, USA (2014 Apr)  
Chair, Genetics Educational Product Committee for ISCC-NIH, Washington (2014 Apr 23)  
Member, Research Grants External Review Panel for Alberta Innovates – Health Solutions (AIHS) - CRIQ Team Reverse Site Visit Edmonton, Alberta (2014 Mar 19)  
Member, External Advisory Board, Penn State Heart and Vascular Institute, Penn State University, Hershey, PA (2014 Mar 12-14)  
Scientific Advisory Committee Member, Fondation Leducq, Paris, France (2009-2014)  
Member, Basic Science Advisory Task Force, American College of Cardiology 2013  
Member, Review Panel, Foundation Leducq Philadelphia, 2012  
AXA Research Fund, Selection Review Committee Member for the Chair of Genetics Risk Assessment, University of Geneva Switzerland, (2012, 2013, 2014)  
Scientific Advisory Board Member, International Society of Cardiovascular Translational Research American College of Cardiology (2011-present)  
Peer Review Committee Member, Genomics Research in Human Health–General Stream, Genome Quebec (2010)  
Reviewer, Sparks Research Training Fellowship (2009)  
Steering Committee Member, CANNeCTIN (2008-present)  
Operations Committee Member, CANNeCTIN (2008-present)  
NHLBI Grant Review Panel Member for the Genome–Wide Scans of Polygenic Diseases (2005)  
Scientific Advisory Board, First International Symposium on Heart Failure: Mechanisms and Management, (1987)  
International Scientific Committee, Council on Silent Ischemia and Infarction, Medical Education Programs, Ltd, Member (1986-1991)  
Reviewer for AHA Scientific Sessions Abstracts (1975-present)

- Task Force on Transplantation, Baylor College of Medicine/The Methodist Hospital, Member Baylor College of Medicine/The Methodist Hospital (1983-2004)
- Department of Medicine Full-Time Faculty Promotions Committee Member, Baylor College of Medicine American Heart Association Texas Affiliate (1982-2004)
- Scientific Sessions Advisory Committee Member, ACC Heart of Innovation Learning Destination, ACC.12-61st Annual Scientific Session & Expo, Chicago USA (2012)
- Member, CIHR China–Canada Joint Health Research Initiative–Grants Program–E American College of Cardiology (2011-2012)
- Member, BioMedicine Call Peer Review, Fondazione Cariplo, (2011)
- Member, Senior Advisory Council, World Heart Federation (2011)
- Member, Medical Advisory Committee for Cancer Cardiovascular Cohort of Ontario Canadian Institutes of Health Research (2008-2010)
- Reviewer, Foundation Leducq Chicago, April 8–9, 2010
- Member, Review Team, Quebec Genome, Canada (2010)
- Member, Genome Quebec Peer Review Committee, Montreal, Quebec, Canada (2010)
- Member, Scientific Executive Committee of the International Academy of Cardiology and the 15th World Congress on Heart Disease (2009)
- Reviewer, ANR Genopat 2008 Funding Programme, France (2008)
- Member, CIHR Team Grant - Committee Canadian Institutes of Health Research (2008)
- Reviewer, Canadian Institute of Health Research, Team Grants (2006-2007)
- Reviewer, National Medical Research Council, Singapore (2007)
- NAHA Research Program and Evaluation Committee Member (RPEC), National American Heart Association (1994-1999)
- Reviewer, Canadian Institutes of Health Research, Team Grant Review Committee (2006)
- Member of the NHLBI Special Emphasis Panel–Genome Association Studies (2006)
- Review Committee Member, Doris Duke Fellowship and Grants (2001-2003)
- Budget, Finance & Investment Committee Member, American College of Cardiology (1997-2003)
- American College of Endocrinology: Writing Committee Member for the Consensus Development Conference on Inpatient Diabetes and Metabolic Control, Washington, DC, (2003)
- Search Committee Member for the Editor of Circulation (2003)
- Pfizer Advisory Committee Member for the Pfizer Fellowships (2000-2002)
- Academic Advisory Board for the Pfizer Postdoctoral Fellowship in Cardiovascular Medicine (2000-2002)
- Strategic Leadership, National American Heart Association (1999-2002)
- Academic Development Program Committee, Baylor College of Medicine, Member Baylor College of Medicine/The Methodist Hospital (1997-2002)
- Member, NHLBI Advisory Council (2000-2001)
- Nominating Committee Member, American College of Cardiology (1998-2000)
- Ad Hoc Task Force to Review the Annual Scientific Sessions American College of Cardiology (1998-1999)
- Educational Products Committee, Member American College of Cardiology (1997-1999)
- Lead Cardiology Consultant, STS–95 for NASA-John Glenn’s return trip to space (1998)
- NHLBI SPARK Conference Member “From genes to Health and Health to Genes” to discuss effective ways for utilizing the increased financial support allocated by Congress (1998)
- Research America’s 435 Project District Leadership Council Member, National American Heart Association (1997)
- Judging Committee for the Young Investigators Award, Member American College of Cardiology (1995-1996)
- Public Affairs Policy Committee Member, American Heart Association (1995-1996)
- Science Advisory and Coordinating Committee -SACC, National American Heart Association (1994-1996)
- AHA Scientific Advisory Committee Member (1994-1996)
- Scientific Publishing Committee Member, National American Heart Association (1992-1996)
- Publishing Committee, American Heart Association (1992-1996)
- Fellowship and Established Investigator Subgroup Member, National American Heart Association (1990-1995)
- Grant Peer Review Committee, National American Heart Association (1990-1995)

AHA National Research Committee Member (1990-1995)  
Executive Committee Member, Council on Circulation, National American Heart Association (1989-1995)  
Subcommittee to Develop and Write ACCSAP American College of Cardiology (1995)  
Annual Scientific Sessions Program Committee Member, National American Heart Association  
Research Advisory Panel, University of Ottawa Heart Institute (1994)  
Ad Hoc Committee on Annual Scientific Session Structure Review Member, American College of Cardiology (1992-1993)  
Scientific Advisory Committee Member, Baylor College of Medicine, /The Methodist Hospital (1987-1993)  
Annual Scientific Session Program Committee, Member American College of Cardiology (1989-1991)  
Committee on Post-Graduate Education, Council on Clinical Cardiology, American Heart Association (1988-1991)  
Ad Hoc Committee Member, Cardiology and Surgery Branches Review, Board of Scientific Councilors, National Heart, Lung, and Blood Institute (1989-1990)  
Parent Committee Member, Specialized Center for Research (SCOR) in Hypertension, National Institute of Health, National Heart, Lung and Blood Institute (1989-1990)  
Safety and Data Monitoring Committee, Bypass Angioplasty Revascularization Investigation Trial, National Heart, Lung, and Blood Institute, Member (1988-1990)  
Young Investigators' Awards Committee, Member American College of Cardiology (1984-1990)  
Baylor College of Medicine Full-Time Faculty Promotions Committee Member, Baylor College of Medicine/The Methodist Hospital (1988-1989)  
Clinic Management Committee Member, Dept. of Medicine, Baylor College of Medicine/ Methodist Hospital (1988-1989)  
Scientific Advisory Committee Member, Heart Research Institute for Molecular Biology, Sydney, Australia (1987-1988)  
Development Committee, American Heart Association, Texas Affiliate, Member American Heart Association Texas Affiliate (1986-1988)  
Research Review Committee, American Heart Association, Texas Affiliate, Member (1986-1988)  
Cardiology Advisory Committee Member, National Heart, Lung, and Blood Institute, Department of Health and Human Services (1984-1988)  
Faculty Appointments and Promotions Committee, Baylor College of Medicine, Member Baylor College of Medicine/The Methodist Hospital (1986-1987)  
Medical & Scientific Committee, American Heart Association Texas Affiliate, Member American Heart Association Texas Affiliate (1985-1987)  
Lecture Series Component Subcommittee, Department of Medicine, Baylor College of Medicine, Member Baylor College of Medicine/The Methodist Hospital (1983-1986)  
Speakers Bureau Task Force, Member, American Heart Association Texas Affiliate  
Subcommittee for Animal Use, Committee for Animal Research, Baylor College of Medicine, Member Baylor College of Medicine/The Methodist Hospital (1984-1985)  
Internal Advisory Committee, National Heart and Blood Vessel Research and Demonstration Center (NRDC), Baylor College of Medicine, Member Baylor College of Medicine/The Methodist Hospital (1983-1985)  
Institutional Review Board for Human Research, The Methodist Hospital, Member Baylor College of Medicine/The Methodist Hospital (1982-1984)  
Cardiovascular and Pulmonary Study Section Member, NHLBI (1980-1982)  
Research Advisory Committee Member, NIH-Cardiovascular and Pulmonary Study Section (1980-1982)  
Research Committee Member, American Heart Association, Missouri Affiliate (1979-1982)  
Fellowship Selection Committee for Buder-Peters Award, Member, American Heart Association, Missouri Affiliate (1982)

## **CONSULTING AND ADVISORY ROLES TO INDUSTRY**

1979-1987 Scientific Advisory Board of Marion Laboratories, Kansas City, Missouri  
1987-1991 Advisory Board of Venture Capital Fund, Houston, Texas  
1997-2007 Scientific Advisory Board of General Electric (Healthcare Division), NY  
1999-2007 Scientific Advisory Board of Vasogen, Toronto, Canada (chair 2000-2007)  
1999-present Scientific Advisory Board of Cumberland Pharmaceuticals, Nashville, Ten  
2004-2008 Scientific Advisory Board of Liponex Inc, Ottawa, Canada

2008-2010 Scientific Advisory Board of ImaSight Inc  
2005-2012 Scientific Advisory Board of Spartan Industries LTD  
2006-2010 Consultant to Quest Diagnostics  
2004-2010 Member, Senior Editorial Board, COR Medical Technologies

### DISTINGUISHED LECTURESHIPS

Keynote Speaker at World Young Scientist Summit, in Wenzhou, China. Genetics Will Revolutionize the Prevention of Heart Disease. (2019, Oct. 26).

Speaker at Beijing. A Primer of Genetics for Heart Disease. (2019, Oct. 27).

Discussant, Transcatheter Cardiovascular Therapeutics; Annual Scientific Meeting in San Francisco (2019, Sept. 25)

Keynote Debater, European Society of Cardiology, Paris, August 3, 2019, Genetics will revolutionise risk scoring in CAD (pro)

Keynote Speaker, CME Course, Halifax, NS, Canada; Genetics of Coronary Artery Disease July 14, 2019

Keynote Speaker, India Cardiac Society and India Cardiovascular Intervention Society, Kolkata, India, Genetics of Coronary Artery Disease. (2019, May 28)

India Cardiac Society and India Cardiovascular Intervention Society, Kolkata, India, Genetics of Coronary Artery Disease. Genetics of Platelet Therapy. (2019, May 29)

India Cardiac Society and India Cardiovascular Intervention Society, Kolkata, India, Genetics of Coronary Artery Disease. Personalized Medicine. (2019, June 1)

India Cardiac Society and India Cardiovascular Intervention Society, Kolkata, India, Genetics of Coronary Artery Disease. Precision Medicine. (2019, June 2)

Keynote Speaker, Beijing Health Summit, Beijing, China. Genetic Prediction of Coronary Artery Disease (2019, May 18)

Co-Chair, Annual Scientific Session. American College of Cardiology, New Orleans, LA. Genetic Testing: New Frontiers in Cardiovascular Care (2019, March 16)

Distinguished Lecturer, Progress in Genetic Medicine, Delhi India, (2019, Jan 20), Cardiology Course sponsored by the American College of Cardiology (ACC)

Distinguished Lecturer, Genetic Prediction of Coronary Artery Disease, Beijing, China (2018, Nov 18)

Distinguished Lecturer, Genetic Prediction of Coronary Artery Disease, Beijing, China (2018, Oct 13)

Distinguished Lecturer, Genetic Prediction of Coronary Artery Disease, Shanghai, China (2017, Nov 13)

Distinguished Lecturer, Genetic Prediction of Coronary Artery Disease, Beijing, China (2017, Nov 14)

Distinguished Lecturer, Genetic Prediction of Coronary Artery Disease, Xian, China (2017, Nov 15)

Distinguished Lecturer, Genetic Prediction of Coronary Artery Disease, Xinxiang, China (2017, Nov 15)

Distinguished Lecturer, Genetic Prediction of Coronary Artery Disease, Tong Chuan, China (2017, Nov 16)

Distinguished Lecturer, Genetic Prediction of Coronary Artery Disease, Zhengzhou, China (2017, Nov 17)

Distinguished Lecturer, Glen E. Garrison Heart and Cardiovascular Health Grand Rounds, Augusta, GA (2017, Oct 24)

Plenary Speaker, Genetics of Coronary Artery Disease, New Delhi, India (Dec., 2014), Cardiology Course sponsored by the American College of Cardiology (ACC)

Distinguished Lecturer, Cardiology Course presented by the American College of Cardiology (ACC) and the Saudi Heart Association (SHA) Jeddah, Saudi Arabia (2014, Oct 25-26)

Opening Speaker, The James T. Willerson MD Cardiovascular Seminar (JTWCVS), Texas Heart Institute, "Fifty Genes for CAD and what have we learned." Houston, Texas (2014, Sep 11)

Keynote Speaker, International Academy of Cardiovascular Sciences, Yetta and Jack Levit Distinguished Lecture, "A Glimpse of Medicine in the Future", Winnipeg Manitoba Canada (2014, Sep 4)

Plenary Speaker, Medicine, A Glimpse of the Future, India Science Institute, Jammu, India (2014, Feb 15)

Honorary Lecture, Genetics of Coronary Artery Disease, Ottawa Heart Research Conference, Ottawa, Canada (May 8, 2014)

Distinguished Lecturer, Opening of The James Willerson Lecture series, University of Texas, Houston, Texas (2014, Sept 11)

Distinguished Lecturer, Cardiovascular Forum, Winnipeg, Manitoba, Canada. (2014, Sept 4)

Keynote Speaker, 40<sup>th</sup> Annual Williamsburg Conference on Heart Disease, Baylor Health Care System, Williamsburg, Virginia (2013 Dec 8-10)

- Keynote Speaker, 65<sup>th</sup> Annual Conference of Cardiological Society of India, BIEC, Bangalore, India (2013 Dec 5-8)
- Honoree Speaker, Negev Dinner, Jewish National Fund of Canada, Ottawa, ON (2013 Oct 29)
- Keynote Speaker & Chair, International Academy of Cardiology, 18<sup>th</sup> World Congress on Heart Disease, Annual Scientific Sessions, “Inflammation - The New Target for Prevention of Coronary Artery Disease”. Vancouver, BC. [2013 July 27]
- Keynote Speaker, 2013 Health Research Caucus on Cardiac Research and Heart Health. “Research Canada: An Alliance for Health Discovery”. Parliament Hill, Ottawa, Canada (2013 May 6)
- Keynote Speaker, 2013 ACCF/BSC Cardiovascular Symposium, American College of Cardiology Foundation/Brazilian Society of Cardiology, “Evolving Impact of OMICS in Approaching CV Disease: A Step-by-Step Building Process”. Sao Paulo, Brazil (2013 May 4)
- Distinguished Lecturer, ACC.13 Heart Failure Symposium, Translational Research Symposium with the International Society for Cardiovascular Translational Research III: Cardiovascular Translational Research for Biologics “Personalized Medicine: Breakthroughs in Genetics”, San Francisco, USA [2013 Mar 10]
- Distinguished Lecturer, American College of Cardiology Foundation, ‘Evolving impact of OMICS in approaching cardiovascular disease - a step-bystep building process’, Third ACCF India Cardiovascular Symposium, Mumbai, India [2013 Jan 19]
- Distinguished Lecturer, ‘Medicine: A Glimpse of the Future’, Royal Canadian Institute for Advancement of Science, co-sponsored by the Gairdner Foundation, Toronto (2013 Jan 13)
- Plenary Speaker, Canadian Cardiovascular Congress, 2012 CCS Research Achievement Award Presentation, Toronto, Ontario (2012 Oct 29)
- Plenary Speaker and Plenary Session Chair, International Academy of Cardiology, 17th World Congress on Heart Disease, Annual Scientific Sessions 2012, “A Glimpse To The Future – Genetics of Heart Disease”, Toronto, Ontario (2012 Jul 28)
- Plenary Speaker, AACC Annual Meeting 2012 and Clinical Lab Expo, “9p21 DNA Variants Associated with Coronary Artery Disease”, American Association for Clinical Chemistry, Los Angeles, California (2012 Jul 16)
- Keynote Speaker, ACVIM Forum 2012, American College of Veterinary Internal Medicine, “Therapy for HCM in Genetic Animal Models” New Orleans, Louisiana, USA (2012 May 30)
- Endowed lectureship, Visiting Professor, Washington University “Genes and the Comprehensive Prevention of Heart Disease”, St Louis, Missouri (2011 Nov 2)
- Endowed lectureship, Anandi L Sharma Visiting Professor of Cardiovascular Medicine, New York, NY (2011 May 23)
- Endowed lectureship, Anna and Harry Borun Visiting Professor, California (2011 May 5-6)
- Keynote Speaker, Chongqing International Heart Congress, Keynote Speaker—“Genes for Coronary Artery Disease—A Pathway to Personalized Medicine”, Chongqing, China (2011 Apr 22–23)
- Keynote Speaker, ACC’11: “Genetic Markers for Risk of Coronary Disease: Ready for Prime Time or Lost in Translation?” New Orleans, LA (2011 Apr 2)
- Keynote Speaker, WCC Scientific Sessions, “The 9p21 variants: Its Prevalence and Impact on Heart Disease”, Beijing, China (2010 June 16–19)
- Keynote Speaker, “Genes and the Heart”, 50th Anniversary Symposium, Gairdner Foundation, University of Ottawa Heart Institute (2009 Jun 3)
- Keynote Speaker, “Medicine: A Glimpse of the Future”, Canadian Association of Former Parliamentarians, Parliament Hill (2009 June 1)
- Endowed lectureship, Lewar Annual Cardiovascular Science Day, “Genes for Coronary Artery Disease—A Pathway to Personalized Medicine”, Toronto, Ontario (2008 May 29)
- Endowed lectureship, Richard S Crampton Lecture, “Personalized Medicine—An Idea Whose Time is Approaching”, Charlottesville, VA (2007 Nov 13)
- Keynote Speaker, Presentation to Cardiologists in St Petersburg, “Can we Live for 150 Years”, (2007 Oct 11–12)
- Keynote Speaker, National Congress of Cardiology Satellite Symposium, “Identification of Genes for Coronary Artery Disease”, Moscow, Russia (2007 Oct 9–11)
- Endowed lectureship, 8th Berman Lecture, “Personalized Medicine—An Idea Whose Time is Approaching”, Case Western Reserve University, Cleveland, Ohio, May 8, 2007
- Keynote Speaker, “State of the Union Address on Cardiovascular Genetics”, Heart & Stroke Clinical Update, Toronto, December 8, 2006
- Keynote Speaker, GE Day, “What if Personalized Medicine enabled you to Glimpse into Your Future?” Calgary, Alberta (2006 Sep 14)

- Lecturer, University of British Columbia, Distinguished Speaker in Cardiovascular Medicine, UBC Division of Cardiology, Vancouver, BC (2006 Oct 5)
- Keynote Speaker, Canadian Cardiovascular Society, State-of-the-Art Lecture, "Molecular Genetics and the Future of Cardiology", Montreal, Quebec (2005 Oct 24)
- Keynote Speaker, General Electric Health Care Day, "Medicine—A Glimpse of the Future", Toronto, Ontario, (2005 Sep 15)
- Plenary Speaker, 15th Asian Congress of Cardiology, New Horizon in Cardiology, Genetic Manipulation in Cardiovascular Diseases, Genetic Determination: Clinical Applications, Cardiomyocyte Rejuvenation, Pattaya, Thailand, Oct. 2004
- Presidential Plenary Address (Simon Dack Lecture) ACC Scientific Sessions, Atlanta, Georgia (2002)
- Endowed lectureship, 4th Annual Keon Lecture, Molecular Cardiology in the 21st century University of Ottawa, Ontario (2002)
- Endowed lectureship, 18th Annual Kenneth W G Brown Memorial Lecture, A glimpse of the immediate future of molecular genetics University of Toronto, Ontario (2002)
- Plenary Speaker, Genetic Testing an Idea Who's Time Has Come, 65th Annual Scientific Sessions, Kyoto, Japan (2001)
- Keynote Speaker, The molecular genetics of atrial fibrillation 1st Annual Symposium on the Electrophysiology of Atrial Fibrillation, Oviedo, Spain June 8–11 2000
- Endowed lectureship, Frank N Wilson Visiting Professor, A glimpse of the 21st century from present day molecular biology, University of Michigan Health System, Ann Arbor, MI June 1–3, 2000
- Keynote Speaker, A glimpse of the 21st century from present day molecular genetics, 5th International Conference of the Jordan Cardiac Society, Amman, Jordan April 19–21, 2000
- Dr E R Smith Honored Lecturer in Cardiovascular Research A glimpse of the future from present day molecular genetics, University of Calgary, Calgary, Alberta, Canada (1999)
- Endowed lectureship, Cardiovascular Society at Mayo Clinic Update of molecular genetics in the cardiomyopathies Rochester, MN (1999)
- Endowed lectureship, Cardiology Grand Rounds, University of California, San Diego, A glimpse of the 21st century from present day molecular biology San Diego, CA (1999)
- Plenary Speaker, A glimpse of the future from present day molecular biology, Sixth Annual Cardiopulmonary Symposium for the Primary Care Provider, Rochester Riverside Convention Center, Rochester, NY (1999)
- Plenary Address, 12th Asian Congress of Cardiology, Genetics of atrial fibrillation, Manila, Philippines (1998)
- Plenary Speaker for the 46th Congress of Japanese Cardiac Society, Beneficial post MI effects of heart rate lowering Ca antagonist/VANQWISH Study, Tokyo, Japan (1998)
- Honored Lecturer, Early Diagnosis of Infarction, 1<sup>st</sup> Theo J Tsagaris Lecture, University of Utah, Salt Lake City, UT (1998)
- Plenary Speaker, Singapore Cardiac Society & The Heart Association of Thailand "Hot Topics in Cardiology 1998", Prospects for gene therapy in coronary artery disease, Phuket, Thailand (1998)
- Keynote Speaker, Molecular Genetics of Hypertrophic Cardiomyopathies XVI World Congress of the (ISHR) International Society for Heart Research, Rhodes, Greece (1998)
- Plenary Speaker, Molecular Genetics of Cardiomyopathies, XIII World Congress of Cardiology, Rio de Janeiro, Brazil (1998)
- Endowed Lectureship, A glimpse of the 21st century from present day molecular biology 7th Annual John McGuire Lectureship, University of Cincinnati, OH (1998)
- Endowed Lectureship, Molecular biology and cardiology: Future prospects, Harvey Memorial Lecturer, Northeastern Ohio Universities College of Medicine, Youngstown, OH (1997)
- Endowed Lectureship, Molecular Cardiology, present and Future Perspectives, Meeting of the West Norwegian Cardiology Society, Bergen, Norway (1997)
- Keynote Speaker, Expanding role of molecular biology in cardiovascular medicine, State of the Art Lectures, III, First Annual Scientific Meeting of the Heart Failure Society of America, Baltimore, MD (1997)
- Lecturer, Structure function analysis of the bMyHC gene and protein, Genomics to Physiology and Beyond: How do we get there? The Banbury Center, Cold Spring Harbor Laboratory, New York (1997)
- Mikamo Lecturer—61st Annual Scientific meeting of Japanese Circulation Society, A glimpse of the 21st century from present day molecular genetics, Tokyo, Japan (1997)
- Honoured Guest Lecturer, in honor of Eugene Braunwald, MD, Harvard University, Boston, Massachusetts (1996)
- Joint Conference of The Methodist Hospital and American Hospital of Istanbul, Recent advances in molecular cardiology and early diagnosis with MB CK Subforms, Istanbul, Turkey (1996)
- Plenary Speaker, Malaysian Heart Association, Current issues on calcium channel blockers in the management of ischemic heart disease, Kuala Lumpur, Malaysia (1996)

- Plenary Speaker, Scientific Symposium of the Singapore Heart Society, Glimpses of the 21st century based upon present-day molecular genetics, Singapore (1996)
- Plenary Speaker, Indonesian Heart Association, Controversy in Ca-antagonist Therapy, Padang, Indonesia (1996)
- Honored Lecturer, Molecular basis of left ventricular hypertrophy and its treatment, University of Korea, Seoul, Korea (1995)
- Plenary Session Honored Lecturer, Molecular Genetics: Implications for HMC and Cardiac Growth, Swedish Medical Association, Stockholm, Sweden (1995)
- Opening Plenary Speaker, Molecular Genetics of Cardiomyopathies, 43rd Annual meeting of the Japanese College of Cardiology, Yokohama, Japan (1995)
- Opening Plenary Speaker for the Asian Pacific Society of Cardiology (1995)
- RT Hall Lecturer, Hypertrophic Cardiomyopathy: What Have We Learned from Molecular Genetics, Cardiac Society of Australia and New Zealand (1995)
- Distinguished Clinical Science Lecturer, How Molecular Biology Will Reshape the Future of Cardiovascular Therapeutics, Boston University School of Medicine, Boston, MA (1995)
- Joseph B Wolffe Memorial Lecturer, Molecular Biology: Unlocking the Secrets of Exercise Science, American College of Sports Medicine, Minneapolis, MN (1995)
- 1995 RN Anderson Lectureship, Futuristic View of Non-Conventional Molecular Genetic Risk Factors for Heart Disease, Victoria General Hospital, Toronto, Canada (1995)
- 1995 Mark Weinstein Memorial Lecturer, Genetic Basis of Cardiac Disease, Suburban Hospital, Bethesda, MD (1995)
- 1995 Sterling Visiting Professor, Molecular Genetics of the Cardiomyopathies, State University of New York Health Science Center at Syracuse, NY (1995)
- Simon Dack Visiting Professorship, Molecular Genetic Risk Factors for Heart Disease and Diagnosis and Treatment of Hypertrophic Cardiomyopathy, Mount Sinai Medical Center, New York, NY (1995)
- 1995 Blount Lecturer, Molecular Genetics of HCM: Clinical Implications, Univ. of Colorado Health Sciences Center, Denver, USA
- Phi Rho Sigma Irving S Cutter Lecturer, Glimpses of the Future from present Day Molecular Genetics, (1994)
- Endowed Lectureship, Martin J Mueller Lectureship, Molecular Genetics: Terror or Therapy? Kansas City, Missouri, (1994)
- Annual Burch Lecturer, Molecular Genetics of Cardiomyopathies, Musser-Burch Society, Tulane University, New Orleans, LA (1993)
- Opening Plenary Lecture for the Second Annual International Academy of Cardiology, The Molecular Biology of Cardiac Hypertrophy and Failure: The Potential for Molecular Intervention, Geneva, Switzerland (1993)
- Simon Rodbard Memorial Lecturer, Molecular Basis for Cardiomyopathies, American College of Chest Physicians, Chicago, IL (1992)
- Pfizer Visiting Professor, Molecular Biology and Its Impact for the Future of Cardiology, University of Virginia Health Science Center, Charlottesville, VA (1992)
- 1992 Southworth Lectureship, Molecular Basis for Cardiac Growth, College of Physicians & Surgeons of Columbia University, New York, NY (1992)
- Herbert Berger Endowed Lecturer, Molecular Cardiology, University of Maryland, Baltimore, MD (1992)
- Arvilla Berger Lecturer, Selecting the Thrombolytic Agent and Beyond, The New York Cardiological Society, NY (1991)
- Plenary Session Speaker, American Heart Association, Anaheim, CA, (1991)
- Endowed Lectureship, Kroc Lecture, University of New Mexico, Albuquerque, New Mexico (1991)
- Endowed Lectureship, First HJC Swan Lecture, Cedars-Sinai Medical Center (1991)
- Endowed Lectureship, James R Neely Lecture, Geisinger Medical Center (1991)
- Plenary Lecturer for Canadian Cardiovascular Society, 1990
- Plenary Speaker, Heart and Stroke Foundation of Canada, Canadian Cardiovascular Society, Halifax, NS, Canada (1990)
- Endowed Lectureship, Jesse E Edwards, MD Lectureship, St Paul, Minnesota (1989)
- Endowed Lectureship, Pfizer Visiting Professorship, Duke University Medical Center, Durham, North Carolina (1989)
- Plenary Speaker, Republic of China Society of Cardiology (1988)
- Plenary Speaker, NIH/NHLBI sponsored US-Poland Joint Symposium in Cardiovascular Diseases, Warsaw, Poland (1988)
- Plenary Speaker, Hellenic Cardiological Society, Athens, Greece (1984)
- Lecturer, The Seventh Annual Ain Shams Medical Congress, Cairo, Egypt (1984)

- Plenary Speaker, The Julius Elson Memorial Lecturer in Cardiology, Christian Hospital Northeast–Northwest, St Louis, Missouri (1983)
- Plenary Speaker, National Symposium, Archives Internationales de Physiologie et de Biochimie, Brussels, Belgium (1983)
- Plenary Speaker, Lecturer, American College of Cardiology Circuit Course, Hungary, Bulgaria and Romania (1979)
- Plenary Speaker, Lecturer, 11th Congress of the South African Society of Physicians, Cape Town, South Africa (1978)

## **LECTURES**

- Genetics in Cardiovascular Risk Assessment: A Sex Specific Approach. Women's Heart Health at Omini Resort in Scottsdale, AZ. (2019, Nov. 15).
- A Career in Cardiovascular Genomics and Genetics, Presented at the American College of Cardiology for Cardiac Fellows. Heart House, Washington, D.C. (2019, Nov. 1).
- Genetic Risk Score Could revolutionize Primary Prevention of Coronary Artery Disease, Dignity Hospital Medical Group, One Team Retreat, Point Hilton Squaw Peak Resort, Phoenix, Arizona, Oct. 11, 2019
- Genetic of CAD, Residents of Internal Medicine, Dignity Health, SJHC, Phoenix, AZ, , August 17, 2019
- Genetics of Coronary Artery Disease, Dignity Health, Chandler Hospital, Chandler Arizona. July 2, 2019
- American College of Cardiology. Annual Scientific Meeting. New Orleans, LA. "Which Genetic Tests are Useful for Risk Stratification of CAD?" (March 16, 2019)
- Vascular Biology Working Group. U.S. Chapter Meeting at ACC. New Orleans, LA. "How close are we to a Useable Genomic Risk Score for CAD?" (March 15, 2019)
- European Society of Cardiology. Annual Scientific Meeting. Munich, Germany "Genomics, proteomics and cardiovascular epidemiology" (August 27, 2018)
- Medical College of Georgia at Augusta University. Vascular Biology Center. "Genetics and Mendelian Randomization for the Prevention of CAD" (October 25, 2017)
- University of Arizona College of Medicine-Tucson. "Genetic Prediction of Coronary Artery Disease" (October 20, 2017)
- European Society of Cardiology. Annual Scientific Meeting, Barcelona, Spain "The Journey to Precision Medicine" (August 27, 2017)
- American Association of Physicians of Indian Origin. Atlantic City, "Genetics & Personalized Medicine" (June 22, 2017)
- American College of Cardiology. Washington, DC: Debate "Personalized and Digital Medicine is THE ANSWER!" (February 6, 2017)
- University of San Diego. Grand Rounds. "Genetics and the Management of Coronary Artery Disease" (October 20, 2016)
- Dalhousie University. 50th Reunion. "Genetics – A Glimpse of the Future" (October 12, 2016)
- Washington, D.C. INOVA. "Genetics and Lessons Learned" (August 9, 2016)
- Washington, D.C. INOVA. "Genetics and Prevention of Coronary Artery Disease" (August 8, 2016)
- Pisa, Italy. International Summit on Ischemic Heart Disease. "Genetics of Coronary Artery Disease" (June 20, 2016)
- Arizona. Banner Retreat. "Medicine – A Glimpse of the Future" (May 13, 2016).
- University of Arizona College of Medicine – Phoenix. Lecture to Medical Students. "Genomics and Genetics of Coronary Artery Disease" (April 20, 2016)
- Virginia. INOVA Cardiovascular Symposium. "Genomics and Cardiovascular Disease: From Science to Clinical Implications" (April 15, 2016)
- University of Arizona College of Medicine – Phoenix. Mini Medical School 3.0. "Medicine – A Glimpse of the Future" (March 9, 2016)
- "9p21 and Coronary Artery Disease", Nashville, Tennessee (January 27, 2016)
- American College of Cardiology Course in Mumbai, India. "Diastolic Heart Failure" (January 25, 2016)
- American College of Cardiology Course in Mumbai, India. "Genetics of Heart Disease" (January 24, 2016)
- University of Arizona College of Medicine Phoenix. Research and the Global Effort (Sept 17, 2015)
- University of Arizona- College of Medicine Phoenix. Genetics and CAD (April, 2015)
- ACC Annual Scientific Meeting, Genetics and Prevention of CAD, San Diego, California. (March, 2015)
- Beijing University. "Genetics of Coronary Artery Disease". Beijing, China (2014 Oct 2)

- Lishui Central Hospital. "Genetics of Coronary Artery Disease". Lishui, China (2014 Sep 30)
- Taian Traditional Hospital. "Genetics of Coronary Artery Disease". Taian, China (2014 Sep 28)
- XuZhou Central Hospital. "The Canadian Health Care System and Its Future. XuZhou, China (2014 Sep 27)
- University of Virginia Health System, Cardiology Grand Rounds. "Genetics: A Glimpse of the Future", Virginia [2013 Oct 14]
- Dalhousie University Medical Alumni Association, "Genetics of Coronary Artery Disease" Shédiac, NB, [2013 Sep 6]
- BioConference Live Genetics & Genomics 2013. "Genetics of Coronary Artery Disease". Labroots Live Webinar [2013 Aug 21]
- Lecturer, Canadian Society of Pharmaceutical Sciences (CSPS) & The Canadian Controlled Release Society (CRS) Annual Symposium Personalized Medicine & Individualized Drug Delivery. "Personalized Genetics of Coronary Artery Disease". The University of British Columbia, Vancouver, BC [2013 Jun 13]
- Lecturer, IMM Seminar Series Speaker, the Brown Foundation Institute of Molecular Medicine (IMM): UTHealth Science Center at Houston. "Genetic Variants Associated with Coronary Artery Disease Risk". Houston, Texas [2013 Apr 12]
- Lecturer, Cardiology Conference, Louisiana State University Health Sciences Center, "Genetic Variants Associated with Coronary Artery Disease Risk" New Orleans, USA [2013 Apr 10]
- Keynote Speaker, University of Ottawa Health Symposium. "Medicine: A Glimpse of the Future". Ottawa [2013 Mar 23]
- Lecturer, ACC.13 Learning Destinations, CV Innovations Educational Forum: Innovations in Cellular Therapy and Genetics: "Personalized Medicine: Breakthroughs in Genetics" San Francisco, USA [2013 Mar 11]
- Lecturer, ACC.13 Interfaces in Clinical CV Imaging: Progress from Pathophysiology to Practice: Heart Muscle and Passive Power "Myocardium in HF: of Disarray, Disintegration and Death" San Francisco, USA [2013 Mar 11]
- Lecturer, National Human Genome Research Institute (NHGRI) Genomic Medicine Centers Meeting 4, American College of Medical Genetics and Genomics, "Genomic Medicine: Physician Literacy in Cardiology", Dallas, Texas USA [2013 Jan 28]
- Lecturer, International Academy of Cardiology, 17th World Congress on Heart Disease, Annual Scientific Sessions 2012, "Genetics Of Heart Disease- Are We Ready For Prime Time?", Toronto, Ontario [2012 Jul 28]
- Lecturer, AACC Annual Meeting 2012 and Clinical Lab Expo, "Genetics of Coronary Artery Disease", American Association for Clinical Chemistry, Los Angeles, California [2012 Jul 16]
- Lecturer, Modern Therapeutics 2012 Conference, CSPT Canadian Society of Pharmacology and Therapeutics, "Genetic Predisposition for Coronary Artery Disease", University of Toronto, [2012 Jun 15]
- Lecturer, 17th Annual Atlantic Canada Cardiovascular Conference, presented by The Divisions of Cardiology and Cardiovascular Surgery in cooperation with Continuing Medical Education, "Personalized Medicine and Coronary Artery Disease" Dalhousie University, Faculty of Medicine, Halifax Nova Scotia, [2012 Apr 20]
- Lecturer, Ottawa Women's Canadian Club 2012 Meeting, "The Genetics of Medicine and Heart Disease", Chateau Laurier, Ottawa [2012 Apr 17]
- Lecturer, ACC.12-61st Annual Scientific Session & Expo, Chicago USA: "9p21: A Major Genetic Predictor of Cardiovascular Disease: Function and Application" and "Personalized Medicine and Coronary Artery Disease" [2012Mar24] and "Personalized Medicine" [2012Mar25]
- Lecturer, Population Health Research Institute, A Joint Institute of McMaster University and Hamilton Health Sciences, "Genes and Coronary Artery Disease", McMaster University, Hamilton, [2012Mar20]
- Lecturer, 23rd Annual Scientific Symposium of Transcatheter Cardiovascular Therapeutics, TCT 2011, "Is the time ripe for genetic testing for Coronary Artery Disease?" San Francisco, California, [2011Nov 7-11]
- Lecturer, Clinical Trials in Canada "Delivering on the Promise of Pharmacogenetics", Toronto, ON, [2011Oct18]
- Lecturer, Post Doctoral Joint Meeting on Cardiovascular Science, University of Ottawa Heart Institute, August 11, 2011
- Lecturer, GE Healthcare CV Advisory Board, "Potential use of Integrin Imaging in imaging hypertrophic cardiomyopathy", London, UK, June 28-29, 2011
- Lecturer, State of the Heart 2nd Symposium, "Bedside Genetic testing-Are we there yet?" Toronto, ON, May 28, 2011
- Lecturer, Critical Markers of Disease 3rd Annual Symposium, "Heart Disease and your Genes", Ottawa Health Centre, Ottawa, ON, May 25, 2011
- Lecturer, Ottawa Heart and Stroke—"Heart Disease: A Glimpse of the Future", Ottawa, ON, April 13, 2011
- Lecturer, ACC'11: Cardiovascular Innovations Forum—"Genetic Predisposition and the Treatment of Hypertension", New Orleans, LA, April 4, 2011
- Lecturer, ACC'11: Cardiovascular Innovations Forum—"The Commercial potential from preventing Heart Disease based on Genes", New Orleans, LA, April 4, 2011
- Lecturer, ACC'11: ISCTR 4th Annual Symposium: "Genomics and Personalized Medicine", New Orleans, LA, Apr 2, 2011
- Lecturer, "Breakfast meeting on Personalized Medicine", Parliament Hill, Ottawa, ON, March 1, 2011

- Lecturer, "Medicine: A Glimpse of the Future", Rideau Club, Ottawa, ON, January 14, 2011
- Lecturer, IT Professionals, "Medicine: A Glimpse of the Future", Westin Hotel, Ottawa, ON, December 1, 2010
- Lecturer, Georgia Chapter ACC Annual CME Meeting, Lake Oconee, "Cardiovascular Genetic Testing—Prime Time has arrived", Atlanta, GA, November 20, 2010
- Lecturer, International Society of Hypertension, "Genome wide Association Studies", Vancouver, BC, Sep 28, 2010
- Lecturer, ANF Symposium, University of Ottawa Heart Institute, September 22–23, 2010
- Lecturer, Ottawa Life Sciences Executive Networking Form, "University of Ottawa Heart Institute Research Opportunities", September 22, 2010
- Lecturer, Siraj Scientific Congress, Annual Scientific Symposium, 120th Anniversary, "Genomics of Coronary Artery Disease: the new Frontier", Bangkok, Thailand, August 14–19, 2010
- OHA Region 2 Meeting, "A Glimpse of Medicine in the 21st Century", Lord Elgin Hotel, Ottawa, ON, June 4, 2010
- Lecturer, Canadian Cardiovascular Research Network (CCRN), "How Pharmacogenetics may change in the Future", Toronto, ON, May 29, 2010
- Lecturer, Rotary Club, Ottawa, May 10, 2010
- Lecturer, Young Investigator Forum, Vancouver, BC, May 4–5, 2010
- Lecturer, Stress Testing & Ambulatory Monitoring Symposium, University of Ottawa Heart Institute, May 1, 2010
- Lecturer, 2010 Symposium Ischemic Cardiomyopathy (2 talks): "Contribution to Genetics and Knowledge Management to Ischemic Heart Disease" and "Health Care and Coronary Artery Disease", Girona, Spain, April 14–16, 2010
- Lecturer, ISCTR Symposium—"Genomics and Personalized Medicine: Atlanta, Georgia, March 13, 2010
- Lecturer, Fraser Institute, Academic Half Day—"Genetics a Cardiologist show know" and Fraser Lecture, "A Glimpse of the Future through Cardiovascular Genetics", Montreal, Quebec, February 3–5, 2010
- Lecturer, "Careers in Genetics and Proteomics", How to become a Cardiovascular Investigator, Washington, DC, Dec 4, 2009
- Lecturer, "Tools and Trends In the Discovery of Human Genome Sequence Variation", American Heart Association Scientific Sessions, Orlando, Florida, November 15–17, 2009
- Lecturer, "The 1000 Genome Project" American Heart Association Scientific Sessions, Orlando, Florida, Nov 15–17, 2009
- Lecturer, "The Genetics of Cardiac Disease", Canadian Society of Internal Medicine, Ottawa, Ontario, October 22, 2009
- Lecturer, "A Glimpse of Medicine in the Future", Dalhousie Medical Alumni Association, DMAA Awards & Recognition Gala Dinner, Dalhousie University, Halifax, NS, September 24, 2009
- Lecturer, "Genetics & Proteogenomics: What's the Difference & What's the Importance", Canadian Vascular Biology Working Group Meeting, Vancouver, BC, August 13–16, 2009
- Lecturer, "Novelties on the Genome Wide Association Studies: Let's Focus on the Genetics of my Patient", West Coast Cardiovascular Forum, San Francisco, California, June 19–21, 2009
- Lecturer, "Genes & Future Genetic Testing", Alumni Annual General Meeting, University of Ottawa Heart Institute, June 4, 2009
- Lecturer, Chapman Lecture, Houston, Texas, May 27–29, 2009
- Lecturer, CANNeCTIN Pharmacogenetics Symposium, Hamilton, Ontario May 20–22 2009
- Lecturer, "The Genetics & Related Clinical Considerations in HCM" Spring Symposium, Oakland, Calif., Apr 25, 2009
- Lecturer, "Personalized Medicine: An idea whose time is approaching", Albert Einstein College of Medicine and Montefiore Medical Center (2 Lectures), April 22 & 23, 2009
- Lecturer, "Personalized Medicine: An idea whose time is approaching", London Cardiac Update, London, ON [2009 Apr 18]
- Lecturer, "Genetics of CAD Disease", ISCTR International Society for Cardiovascular Translational Research, San Diego, California, February 28, 2009
- Lecturer, "Gene Therapy in Cardiology", Michigan, January 23, 2009
- Lecturer, "The Importance of Molecular Medicine to Modern Cardiology", Emeritus AUC Meeting, Carmel, Calif. [2009 Jan 7–9]
- Lecturer, "Novelties on Congenital Syndromes, Cardiomyopathies, Arrhythmias, 41st Annual New York Cardiovascular Symposium, December 12–14, 2008
- Lecturer, "How to become a Cardiovascular Investigator Program", Washington, DC, December 5 & 6, 2008
- Lecturer, "Identifying genes for Coronary Artery Disease", Iranian Heart Association Scientific Sessions & "Genetics of Hypertrophic Cardiomyopathy", Saudi Arabia Heart Association, November 18–21, 2008
- Lecturer, "Evidence of Technology with Genetic Animals", ITAC, Toronto, Ontario, November 13, 2009

- Lecturer, "Identification of Genes for Coronary Artery Disease", Taipei, Taiwan, October 4–11, 2008
- Lecturer, "Genetics, Molecular Pathophysiology and Treatment of Hypertrophic Cardiomyopathy", Taipei, Taiwan [2008 Oct 4]
- Lecturer, 12th Annual Heart Failure Society, "Genome-wide Association Studies: Caveats & Promises", Toronto, Ontario, September 21–24, 2008
- Lecturer, "New Technologies: Genomics", Jornada Cicerone Workshop, Madrid, Spain, September 19–20, 2008
- Lecturer, 14th World Congress on Heart Disease, "Genetics of Myocardial Infarction", Toronto, Ontario, July 27, 2008
- Lecturer, First Interventional Cardiology International Conference, "Personalized Medicine: An Idea whose time has come", Guayaquil, Ecuador, July 17, 2008
- Lecturer, Mercy Gilbert Center, "Personalized Medicine: An Idea whose time has come", Arizona Heart Centre, Phoenix, AZ, July 11–12, 2008
- Lecturer, First CNIC Cardiovascular Symposium, "Genetics of Coronary Artery Disease", Madrid, Spain, Jun27–28, 2008
- Lecturer, 2nd Annual International Congress of Cardiomyopathies and Heart Failure, "Statin and Heart Failure", Toronto, Ontario, June 14, 2008
- Lecturer, 2nd Annual International Congress of Cardiomyopathies and Heart Failure, "The First Common Gene for Coronary Artery Disease", Toronto, Ontario, June 14, 2008
- Lecturer, 2nd Annual International Congress of Cardiomyopathies and Heart Failure, "Hypertrophic Cardiomyopathy Update", Toronto, Ontario, June 12, 2008
- Lecturer, Mazankowski Alberta Heart Institute, International Symposium, "Genes, Epistasis and the Environment", Edmonton, Alberta, June 3, 2008
- Lecturer, Regenerative Medicine Research Day, "Personalized Medicine—An Idea Whose time has come", Ottawa, June 2, 2008
- Lecturer, Cardiology Grand Rounds, "Personalized Medicine—An Idea whose time is approaching", London, ON, May 26, 2008
- Lecturer, 25th Annual Symposium—Troubles with Rhythm: Molecular and Genetic Basis for Cardiac Arrhythmias, "Genetics of WPW and Atrial Fibrillation", Montreal, Quebec, May 21, 2008
- Italian National Research Council (CNR) - Genome Canada Workshop, Rome, Italy, April 2008
- Lecturer, SAIP Symposium, "Bringing Preventive Cardiology and Genetics Together: Pharmacogenetics, Tailoring Risk Detection and Treatment", Chicago, March 30, 2008
- Lecturer, 30th Annual CV Symposium, "Personalized Medicine—An Idea which is rapidly Approaching", Fort Lauderdale, February 21–24, 2008
- Lecturer, Kettering Cardiology Colloquium, "The Genetic Component of Coronary Artery Disease—A Portent of things to come", Dayton, Ohio, February 20, 2008
- Lecturer, International Society for Cardiovascular Translational Research Symposium, "Personalized Medicine—An Idea whose Time is Approaching", February 10, 2008
- Lecturer, CHEO Genetics Education Rounds, "Personalized Medicine—An Idea whose Time is Approaching", CHEO [2008 Jan29]
- Lecturer, CNIC Seminar Series, "Personalized Medicine—An Idea Whose Time is Approaching", Madrid, Spain, [2008 Jan21]
- Lecturer, Cardiology Grand Rounds Lecture, Oregon Health and Sciences University, "Personalized Medicine—An Idea whose Time is Approaching", Portland, Oregon, January 10, 2008
- Lecturer, Cardiology Grand Rounds Lecture, Oregon Health and Sciences University, Lecture to Cardiovascular Fellows, "Genetics of Cardiovascular Disorders", Portland, Oregon, January 10, 2008
- Lecturer, National Capital Alumni of Harvard Business School, "Glimpse of Medicine in the Future", St Paul's University, Ottawa, Ontario, November 21, 2007
- Lecturer, 13th Annual Global Chapter—Vascular Biology Working Group, "Potential Role of New Genetic Markers in Predicting MI", Orlando, Florida, November 3, 2007
- Lecturer, Personalized Medicine Symposium, "Genotypic and Phenotypic Markers of CAD", Washington, DC, Oct25/07
- Lecturer, 19th Annual Scientific Symposium of Transcatheter Cardiovascular Therapeutics (TCT) 2007, "Hypertrophic Cardiomyopathy: Etiology, presentation and Natural History", Washington, DC, October 20, 2007
- Lecturer, "The Human Genome and Gene Therapy: Prospects for Management of Cardiovascular Diseases", Canadian Vascular Biology Symposium, Vancouver, BC, August 9–12, 2007
- Lecturer, "Pursuing Genes that contribute to Coronary Artery Disease—An Idea whose Time has come", International Academy of Cardiology Annual Scientific Sessions, Vancouver, BC, June 28–30, 2007

- Lecturer, ICRHL Leadership in Science Forum, Toronto, Ontario, June 6, 2007
- Lecturer, China Tour: Genes in the 21st Century, May 16–26, 2007
- Lecturer, “Genetics & CVD: An Idea Whose Time Has Come”, Post ACC Symposium, Toronto, April 28, 2007
- Lecturer, “Identifying Genes for Coronary Artery Disease: An Idea whose Time has come”, American College of Medical Genetics, Nashville, Tennessee, March 25, 2007
- Lecturer, “Aggressive Medical Therapy versus Interventional Therapy”, 23rd Annual Cardiovascular Conference AstraZeneca Satellite Symposium, From Vulnerable Plaque to the Vulnerable Patient: A Call to Action, Lake Louise, Alberta, March 11, 2007
- Lecturer, GE Healthcare, New York City, New York, March 7–8, 2007
- Lecturer, Tustin Hospital & Medical Center, “Impacts of Genetics on Medical Practice, Los Angeles, CA, Oct26, 2006
- Lecturer, Canadian Cardiovascular Congress, Genetics and Cardiovascular Disease, CIHR Workshop on Personalized Medicine, “The Role for Personalized Medicine”, October 23, 2006
- Lecturer, The CJC Symposium, at the Canadian Cardiovascular Congress, Genetics and Cardiovascular Disease, “Identifying Genes for Coronary Artery Disease—An idea whose time has come”, October 22, 2006, Vancouver, BC
- Lecturer, Affymetrix Technology Seminar, Affymetrix, October 18, 2006
- Lecturer, Global Conference on the Future of Heart Health & Disease, “Can We Live for 150 Years?” Winnipeg, Man, October 12–15, 2006
- Lecturer, University of British Columbia, Distinguished Speaker in Cardiology, Vancouver, BC, October 5, 2006
- Lecturer, GE Day Keynote Speaker, “What if Personalized Medicine allowed you to Glimpse into Your Future?” Calgary, Alberta, September 14, 2006
- Lecturer, Heart Failure Society of America, 10th Annual Scientific Meeting, “Mechanisms and Management of Uncommon Cardiomyopathies”, Seattle, WA, September 13, 2006
- Lecturer, 40th Class Reunion, “A Glimpse of Genetics for the Future”, Oak Island, Nova Scotia, September 8, 2005
- Lecturer, 16th World Congress—World Society of Cardio—Thoracic Surgeons, “Cell-Based Therapies: Tissue Engineering”, Ottawa, Ontario, August 17–20, 2006
- Lecturer, Cardiology Update Conference, “Do We Need Universal Health Insurance—Problems with our present System”, and “The Time has come for Personalized Medicine”, Leavenworth, Washington, DC, July 1, 2006
- Lecturer, University of Ottawa Heart Institute Cardiac Diagnostic Symposium, “Genetics in the Future”, Mont Tremblant, Quebec, May 27, 2006
- Lecturer, 3rd Annual National Research Forum for Young Investigators in Circulatory and Respiratory Health, “To Screen or Not to Screen is not the Question—It is when and how to Screen”, Winnipeg, Manitoba, May 4–7, 2006
- Lecturer, 6th Annual Texas Update in Cardiovascular Advancements, “HOCM and its Treatments”, Houston, TX, April 1, 2006
- Lecturer, Cardiovascular Innovation Symposium 2006, Crotonville, New York, February 22–24, 2006
- Lecturer, 28th Annual Cardiovascular Symposium, “The Human Genome Project and the Future in Cardiology”, Fort Lauderdale, Florida, February 12, 2006
- Lecturer, Inaugural Conference International Society for Genomics, Proteomics and Cellular Therapy, “Human Genome Project”, Scottsdale, Arizona, February 10, 2006
- Lecturer, “How to Become a Cardiovascular Investigator”, Bethesda, Maryland, December 2, 2005
- Lecturer, 13th Annual William L Winters, MD Lectureship, Texas Medical Center, Houston, Texas, December 1, 2005
- Lecturer, BioNorth 2005, “Identifying Genes that Predispose Individuals to Coronary Artery Disease—An Idea Whose Time has Come”, Ottawa, Ontario, November 28, 2005
- Lecturer, Canadian Cardiovascular Society, State-of-the-Art Lecture, “Molecular Genetics and the Future of Cardiology”, Montreal, Quebec, October 24, 2005
- Lecturer, 8th Annual Joint Summit in Cardiology, “Genetic Testing in Cardiovascular Disease”, Louisville, Kentucky, October 20–21, 2005
- Lecturer, Cutting Edge Symposium, “The Impact of Genetics on Cardiology Practice”, Long Beach, California, Oct 7, 2005
- Lecturer, Institute of Cardiovascular Sciences Award 2005, “A Glimpse of the 21st Century from present day Molecular Genetics, September 30, 2005, Winnipeg, Manitoba
- Lecturer, CHARM Workshop, Angiotensin II Blockers and Treatment of Heart Failure, Launch of Approval for Canestatin in Canada, September 21, 2005, Toronto, Ontario

- Lecturer, Arrhythmia SAP 3rd Annual Cardiology Symposium, "Genetic Primer for the Cardiologist: and "The Genetics of Heart Failure", Ennis, Ireland, June 24–25, 2005
- Lecturer, Canadian Chinese Medical Society of British Columbia, "A Glimpse of the 21st Century from Molecular Genetics", Vancouver, BC, June 10–12, 2005
- Lecturer, How to Become a CV Investigator, "Careers in Basic Cardiovascular Research", Washington, DC, June 3–4, 2005
- Lecturer, 2nd Annual Cardiovascular Summit, "Genetics and Cardiovascular Disease" Boca Raton, Florida, May 5–7, 2005
- Lecturer, AMA Volunteer Leadership Planning Conference, Genetics and a Glimpse of the Future, April 28th, 2005
- Lecturer, 4th Annual Southlake Symposium, "Cardiovascular Disease in the 21st Century", April 23rd, 2005
- Lecturer, Cardiology Grand Rounds, Montefiore, New York, April 5th, 2005
- Lecturer, Ronnie Campbell Lecture: The Genome: Boom or Bust?" 21st Annual Cardiology Conference, Lake Louise, Alberta, March 20–24, 2005
- Lecturer, 2005 Cardiovascular Innovation Symposium, February 4–6, 2005
- Lecturer, GE Healthcare Kick Off, Glimpse of Medicine in the 21st Century, Hull, Quebec, January 29, 2005
- Lecturer, 27th Annual Cardiovascular Symposium, "Glimpse of the 21st Century from present Day Molecular Genetics", Jan 27, 2005
- Lecturer, Ottawa Centre for Research Innovation, "Glimpse of the 21st Century from present Day Molecular Genetics", Jan 26, 2005
- Lecturer, University of Southern California, Grand Rounds Speaker, A Glimpse of the Future through Molecular Genetics, October 5, 2004
- Lecturer, University of California, LA, Grand Rounds Speaker, A Glimpse of the Future through Molecular Genetics, Oct 5, 2004
- Lecturer, Transcatheter Cardiovascular Therapeutics 2004, Genetics, Genomics and Proteomics for the Interventional Cardiologist (Lecture 1), Translating Genetic Discoveries into Clinical Practice (Lecture 2) Washington, DC, September 27, 2004,
- Lecturer, 8th Annual Meeting, Heart Failure Society of America, Anemia in Heart Failure, September 12–15, 2004
- Lecturer, Greater Toronto Association of Adult Cardiology, Fall Retreat, "Glimpse of the Future from present Day Molecular Genetics", September 11, 2004
- Lecturer, Cardiovascular Landmark Lecture, A glimpse of the 21st century from present day molecular genetics XVII World Congress of the International Society for Heart Research, Winnipeg, Canada (2001)
- Lecturer, Invited Lecturer, the Human Genome Project, 21st International Society For Heart & Lung Transplantation, Vancouver, Canada (2001)
- Lecturer, Cardiovascular Landmark Lecture, A glimpse of the 21st century from present day molecular genetics XVII World Congress of the International Society for Heart Research, Winnipeg, Canada July 6–11, 2001
- Lecturer, Genetics of heart failure and dilated cardiomyopathy Heart Failure Summit, Toronto, Ontario June 6–8, 2000
- Lecturer, Genetic diversity and cardiovascular risk The Practice of Evidence-Based Cardiology for the Clinician by McMaster University, Hamilton, Ontario, Canada April 27–29, 2000
- Lecturer, Molecular basis for arrhythmogenic right ventricular dysplasia, 5th International Conference of the Jordan Cardiac Society, Amman, Jordan April 19–21, 2000
- A glimpse of the 21st century from present day molecular cardiology Innovations and Inventions for Prevention and Intervention of Cardiovascular Disease by The Heart Institute at Regional Medical Center Point, Hudson, FL, April 15, 2000
- Potential of genetic insight to identify hypertrophic cardiomyopathy prior to clinical expression to improve future treatment Texas Update in Cardiovascular Advancements by the University of Texas Medical Branch at Galveston, Austin, TX April 7–9, 2000
- A glimpse of the 21st century from present day molecular biology Treatment Attacks on the Coronary Valley, University of Kentucky, College of Medicine, Louisville, KY, Feb 12, 2000
- Speaker for the National Assembly of Delegates in Dallas, National American Heart Association (1999)
- A glimpse of the future from present day molecular biology 17th Annual Cardiology Seminar at Bellin Memorial Hospital, Green Bay, WI (1999)
- A Glimpse of the future from present day molecular genetics Cardiology at the Limits 3, University of Capetown Medical School, Capetown, South Africa (1999)
- A glimpse of the 21st Century from present day molecular genetics, 16th Annual J Gerard Mudd Lecture, St Louis University, St Louis, MO (1999)

Preventive Cardiology in the 21st Century, Singapore Cardiac Society, Singapore (1998)

Speaker for the 9th Annual Meeting of the California Chapter of the American College of Cardiology, Cardiology and Beyond—Entering the New Millennium, 10–24–98, Santa Monica, CA (1998)

From genes to Health and Health to Genes. A member of this NHLBI SPARK Conference to discuss effective ways for utilizing the increased financial support allocated by Congress (1998)

A glimpse of the 21st century from present day molecular genetics, New England Medical Center and Mass General Hospital Cardiology Grand Rounds, Boston, MA (1997)

Current concepts on the management of acute myocardial infarction: Beneficial post myocardial infarction effects of heart rate lowering calcium channel blockers, XIX<sup>th</sup> Congress of the European Society of Cardiology, Stockholm, Sweden (1997)

Lecturer at the Yale University School of Medicine, 7th Annual Cardiovascular Symposium, The Genetics of Atrial Fibrillation New Haven, CT (1997)

Baylor College of Medicine–Moscow State University Medical Education Event, Predictors of cardiovascular myopathy: A glimpse of the 21st century from present day molecular genetics, Linked via satellite from Houston, Texas (1997)

Third International Conference of Jordan Cardiac Society, present–Day Molecular Genetics of Cardiomyopathies: A Glimpse into the 21st Century, Amman, Jordan (1996)

Controversies in Cardiology, 45th Annual Scientific Sessions of the American College of Cardiology, Orlando, Calcium antagonists produce adverse outcomes—When used to treat angina, myocardial infarction, hypertension, Florida, (1996)

Guest Lecturer, Alumni Scientific Symposium, Baylor College of Medicine, 1996

Thrombolysis in 1994 and Beyond, Guest Lecturer for Celebration of Opening of the Heart Center of Wheeling, (1994)

Lecturer, American Association for Clinical Chemistry, 41st National Meeting, Atlanta, Georgia (1989)

Lecturer, Impact of Insights Gained from Molecular Biology, American College of Cardiology, Anaheim, Calif. (1989)

Lecturer, Annual Meeting of the Royal College of Physicians and Surgeons, Canada 1987

Lecturer, InterAmerican Society of Cardiology, Vancouver, Canada (1985)

## PUBLICATIONS (h-index 105)

### Original Manuscripts in Basic Research

1. Patel et al., **CARDIoGRAMplusC4D (incl. Roberts R).** Association of Chromosome 9p21 with Subsequent Coronary Heart Disease Events. *Circulation.* 2019 Mar; 12(4)
2. Schunkert, Heribert & Erdmann, Jeanette & Samani, Sir **CARDIoGRAM (incl. Roberts R).** CARDIoGRAM celebrates its 10th Anniversary. *European Heart Journal.* 2019 Jun;40: 1664-1666.10.1093/eurheartj/ehz347.
3. Adlam D, Olsen T, Combaret N, Kovacic J et al, **CARDIoGRAMplusC4D (incl. Roberts R).** Association of the PHACTR1/EDN1 genetic locus with spontaneous coronary artery dissection. *J Amer Col Cardio.* 2019 Jan;73(1): 58-66.
4. Zhao W, Rasheed A, et al **CARDIoGRAMplusC4D (incl. Roberts R).** Identification of new susceptibility loci for type 2 diabetes and shared etiological pathways with coronary heart disease. *Nat Genet.* 2017 Oct;49(10):1450-1457.
5. Brænne, I., Zeng, L., Willenborg, C., Tragante, V., Kessler, T., **CARDIoGRAM Consortium (incl. Roberts R.), ... Schunkert, H.** Genomic correlates of glatiramer acetate adverse cardiovascular effects lead to a novel locus mediating coronary risk. *PloS one,* 2017 Aug; 12(8), e0182999. doi:10.1371/journal.pone.0182999
6. Klarin D, et al., **CARDIoGRAMplusC4D (incl. Roberts R.)** Genetic analysis in UK Biobank links insulin resistance and transendothelial migration pathways to coronary artery disease. *Nature Genetics.* 2017 Jul; 49(9): 1392-1397 doi: 10.1038/ng.3914.
7. Nelson C, Goel A, Butterworth A, Kanoni S et al, **CARDIoGRAMplusC4D (incl. Roberts R).** Association analyses based on false discovery rate implicate new loci for coronary artery disease. *Nat Genetics.* 2017 Jul; 49(9):1385-1391. doi: 10.1038/ng.3913
8. Howson J, Zhao W, Barnes D, Ho WK et al, **CARDIoGRAMplusC4D (incl. Roberts R).** Fifteen new risk loci for coronary artery disease highlight arterial-wall-specific mechanisms. *Nat Genetics.* 2017 Jul; 49(7):1113-1119. doi: 10.1038/ng.3874
9. Saleheen D, Zhao W, Young R, Ho WK et al; **CARDIoGRAMplusC4D (incl. Roberts R).** Loss of cardio-protective effects at the ADAMTS7 locus due to gene-smoking interactions. *Circulation.* 2017 June 13;135(24):2336-2353. doi: 10.1161/CIRCULATIONAHA.116.022069.
10. Magosi LE, et al, **CARDIoGRAMplusC4D (incl. Roberts R).** Identifying systematic heterogeneity patterns in genetic association meta-analysis studies. *PLoS Genet.* 2017 May 1;13(5):e1006755. doi: 10.1371/journal.pgen.1006755.
11. Webb,TR et al, **CARDioGRAM (incl. Roberts R).** Systematic Evaluation of pleiotropy Identifies 6 further Loci Associated with CAD. *JACC*, 2017 Feb, 21; 69, 823-836
12. Power RA, et al., **CARDIoGRAM Consortium (incl. Roberts R).** Genome-wide Association for Major Depression Through Age at Onset Stratification: Major Depressive Disorder Working Group of the Psychiatric Genomics Consortium. *Biological psychiatry,* 2017 Feb; 81(4), 325-335. doi:10.1016/j.biopsych.2016.05.010
13. Loley, C. et al, **CARDIoGRAMplusC4D (incl. Roberts R).** No Association of Coronary Artery Disease with X-Chromosomal Variants in Comprehensive International Meta-Analysis. *Sci. Rep.* 2016 Oct 12 6, 35278; doi: 10.1038/srep35278 (2016).
14. Ehret GB, et al (incl. Roberts R).. The genetics of blood pressure regulation and its target organs from association studies in 342,415 individuals. *Nat Genetics.* 2016 Sep 05. doi: 10.1038/ng.3667.

15. Golbus J, et al, (**CARDIoGRAMplusC4D (incl. Roberts R)**). Common and Rare Genetic Variation in CCR2, CCR5, or CX3CR1 and Risk of Atherosclerotic Coronary Heart Disease and Glucometabolic Traits. *Circ Cardiovasc Genet.* 2016 Jun; 9(3):250-258.
16. Zanoni P, et al (**incl. Roberts R**). Rare variant in scavenger receptor BI raises HDL cholesterol and increases risk of coronary heart disease. *Science.* 2016 Mar 11;351(6278):1165-71.
17. Hartiala, J. A. et al (**incl. Roberts R**). Genome-wide association study and targeted metabolomics identifies sex-specific association of CPS1 with coronary artery disease. *Nat. Commun.* 2016 Jan, 29; 7:10558 doi: 10.1038/ncomms10558.
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